

# 2007 Florida Energy Commission

## Report to the Legislature

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# FLORIDA ENERGY COMMISSION

**December 31, 2007**

**The Honorable Ken Pruitt  
Florida Senate President  
The Capitol  
Tallahassee, Florida**

**The Honorable Marco Rubio  
Speaker of the Florida House of Representatives  
The Capitol  
Tallahassee, Florida**

Dear President Pruitt and Speaker Rubio:

You have given the Florida Energy Commission a responsibility to provide solid recommendations that lawmakers can use to create an energy policy that protects our public health, environment and economy. I believe we have done just that over the past year, and we are dedicated to continue.

I credit this accomplishment to the commitment and drive of the members and staff of this Commission. Their dedication has been, and continues to be, an inspiration to me. I also credit the many others whose valuable information and insight was critical in developing this report – and often provided at their own expense. In turn, we have made every effort to transfer onto these pages their passion and dedication to making Florida an energy leader.

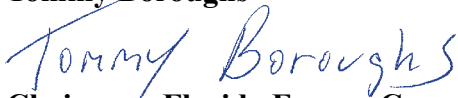
A core aspect of our mission is inclusiveness: We provided any Floridian who wanted a seat at our table with the opportunity to participate. This approach gave us access to the expertise of many Floridians who have willingly spent their time, money and effort to contribute to Florida's energy future. It gave Floridians a chance to become engaged in the process of developing energy policy, which affects them now, and always will.

Forming an energy policy is an ongoing task. Obviously, there were more issues than we could adequately address within one year. We plan to address any outstanding issues in coming years, beginning with our 2008 report. Because energy and its issues are ever-evolving, we believe it will always be necessary to review and revise Florida's energy policy.

The FEC believes this report marks the beginning of a new era in which Florida takes a more strategic and deliberate approach to how energy is provided and used in the state. We strongly believe the recommendations contained in this report can result in an energy policy that will work best for Florida's future.

I sincerely thank you for this opportunity to assist the Florida Legislature, and for your support in our quest to make Florida an energy leader.

**Tommy Boroughs**



**Chairman, Florida Energy Commission**



# Introduction

The reason to read this report is simple, and yet compelling. Florida is the third largest state in the Union. It leads all other states in growth with the much quoted figure of almost 1,000 people moving into our state every day, testing the capabilities of our infrastructure. It is a peninsula state cut off from the rest of the Union except for its contiguous northern boarder making it difficult to utilize interstate power transmission and gas pipe lines. We are called the Sunshine State, yet less than 2 percent of Florida's generation capacity comes from renewable energy, including solar. Florida has no fossil-based natural resource deposits that are capable of supplying a fuel source. Therefore, we are dependent on other states or nations for our energy supply.

Nor does Florida have a comprehensive, but more importantly, a strategic state energy policy to provide a roadmap out of this situation. That is not meant to be an accusatory statement, it is mere fact. The provision of power from source to user is a complex process. It involves many participants with much state oversight. As such, it is easy to worry about today and not worry about who should be planning for tomorrow. The Legislature has asked this Commission to help them plan for Florida's energy future.

The Florida Energy Commission is charged with developing recommendations for legislation to establish a state energy policy. The Commission has spent since last January doing just that. The Commission's division of work into the four advisory groups as explained later in this report resulted in the Commission adopting 85 recommendations. Those recommendations have been generally grouped into the following policy goals for this report:

- Restructuring the State Governance for Developing Florida's Energy Policies and Programs
- Responding to the Challenges of Global Climate Change
- Increasing Florida's Energy Efficiency and Conservation Efforts
- Maximizing Florida's Development of Renewable Energy Resources

- Strengthening Florida's Energy Supply and Delivery Infrastructure
- Enhancing Florida's Energy-Related Education, Research and Development Programs
- Developing Issues for the FEC's 2008 Report

Some of the recommendations reflect so-called "low hanging fruit" resulting in incremental improvement. Some recommendations tackle significant policy issues resulting in significant improvement in the State's energy situation. Both are important. Climate change was a ubiquitous issue in state government this year and the Climate Change Advisory Group was the most active, and the largest. Education and research issues turned out to be of particular importance across all sectors of the Commission's work. Therefore, in order to weave a thread of continuity, all the education and research recommendations are grouped together.

It has never been more important to have a strategic state energy plan than now. As with many things these days, we can never go back to the way they once were. The availability and cost of fuel will never be the same. Therefore, we need fuel diversity and renewable energy. The reduction of the State's carbon foot print must be made to fit within our overall energy policy. Therefore, we need greenhouse gas reduction targets. The examples can go on and on. But it is important, if not axiomatic, to realize that these possibilities or eventualities must be taken into consideration. Not to plan, is a poor plan at best.



# Executive Summary

Florida needs a comprehensive and strategic state energy policy to provide a roadmap to a healthier, cleaner, and more economically robust and independent energy future. But the most important element of this policy is strategy. Generating, transmitting and providing energy to end users is a complex process involving many stakeholders and government entities, and as such, often lends itself more to short-term consideration than that of the long-term. But a convergence of factors has made long-term energy policy planning imperative: these factors include rising costs, growing environmental concerns (including climate change concerns), a desire for energy independence, evolving national and international energy policies and perceived economic development opportunities.

In 2007, its first year, one of the Florida Energy Commission's (FEC) most challenging tasks was to keep in context the sense of public, business and governmental urgency to tackle all aspects of the energy issue. Quality cannot be rushed, and many sound long term decisions take more than one year: Florida's current energy challenges didn't materialize overnight, and we cannot resolve them overnight.

The Legislature has asked the FEC to help them plan for Florida's future by recommending legislation to establish a state energy policy. In response to this request and Florida's current needs and circumstances, this report provides recommendations addressing a wide range of policy issues. Some recommendations would result in incremental improvement, while others would result in more significant improvement in Florida's energy situation. But all are important.

Early on, the FEC grouped its work into four advisory groups. The recommendations that emerged from that process fall within more specific policy goals such as energy-policy governance, responding to climate-change, using renewable energy, increasing energy efficiency and conservation efforts, strengthening Florida's energy-supply-and-delivery infrastructure, and coordinating energy research and development. Within these goals lie specific objectives, such as greenhouse-gas reduction, regulatory reform, energy research col-

laboration, and accelerating the transition of technology from lab to commercial availability, and more. This report also lays the groundwork for the issues it plans to delve into in greater detail in 2008.

## **Restructuring the State Governance for Developing Florida's Energy Policies and Programs**

Currently, a number of Florida governmental entities develop and implement energy policy. Aligned with its desire to see Florida take a more deliberate approach to energy policy is its vision for unified state energy-policy governance. This vision includes an FEC with more members, including gubernatorial appointees and Senate confirmation for all appointees. The Commission's increased responsibilities would include making recommendations for grant awards, authorizing incentive programs from appropriated funds, public awareness advocacy and conducting educational and academic summits. The FEC would act as the major energy-policy board making recommendations to state government to ensure that Florida's climate and energy policies are properly implemented.

## **Responding to the Challenges of Global Climate Change**

Though some uncertainty still surrounds climate change and the appropriate state policy response, Florida's 1,350 mile coastline makes its effects – a primary one being sea-level rise – a major concern.

Though the scientific community continues to review the potential effects of climate change, it clearly agrees that increasing greenhouse gas concentrations are causing an increase in global temperatures, and that man is primarily responsible for this increase.

The FEC's Climate Change recommendations are hinged on four areas, and set targets to reduce greenhouse gases, require an inventory of such, put state government in a position to lead by example through education and unification of Florida's energy governance.



The FEC's greenhouse emissions-reduction targets call for reducing greenhouse gas emissions to year 2000 emission levels by the year 2020, to 1990 levels by 2030, and to 80 percent below 1990 levels by 2050. They are ambitious, but allow enough time to add more nuclear generation to Florida's mix, and to give biomass and solar energy adequate time to become affordable and more commercially available.

Before being able to reduce greenhouse gases, it is imperative to identify the sources and amounts emitted. Inventory, reporting, and registry systems are necessary tools for implementing greenhouse-gas reduction plans because they support the State's action plan, targets, and regional leadership role.

These recommendations support state government taking a leadership role in reducing its carbon footprint, and setting a precedent for local governments, businesses and citizens to do the same.

### **Increasing Florida's Energy Efficiency and Conservation Efforts**

Currently, growth, the desire for greater energy security, and other factors, present questions about how Florida will meet long-range energy needs, and the role of energy efficiency and conservation programs in doing so. Energy efficiency and conservation programs and incentives offer energy consumers ways to take ownership of their future, and increase the state's energy independence. Improving the energy efficiency of Florida's homes, businesses, schools, governments, and industries is one of the most cost-effective ways to address the state's energy-related challenges.

In this report, we present a series of recommendations for further increasing the efficiency of electricity and natural gas, and reducing peak power demand. These recommendations focus on the areas of building energy efficiency, utility demand-side management, public-sector policies ("Lead by Example" initiatives), and consumer incentives and assistance programs.

### **Maximizing Florida's Development of Renewable Energy Resources**

It is imperative to keep renewable energy policies mea-

sured against, and aligned with, Florida's overall energy, environmental and economic policies and goals, when implementing renewable energy policies. Florida's renewable energy potential differs greatly from that of other states. Therefore, we must create a renewable portfolio standard with special consideration of what is realistic in this state.

As Florida progresses in developing its energy policy, one Florida-specific version of the term "renewable" should be used consistently through out the Florida Statutes. In this report, the FEC defines renewable energy within the context of Florida's unique population, economy and geographic environment.

To that end, in the area of renewable energy, the FEC is recommending further examination by the Florida Public Service Commission (FPSC) and the Florida Department of Environmental Protection to determine, assess and evaluate Florida's current renewable energy status and the proper scenarios for a renewable portfolio standard. The Commission also is recommending that electric customers be allowed to generate renewable electricity on their property and sell a portion back to the grid.

### **Strengthening Florida's Energy Supply and Delivery Infrastructure**

Ultimately, it will not be possible to meet Florida's critical energy and economic needs, including reducing greenhouse gas emissions, and diversifying its transportation fuels, without enhancing, expanding, and diversifying Florida's energy infrastructure.

This report presents a series of recommendations intended to fortify the state's energy infrastructure, focused on the key areas of generation diversity, nuclear power, fuel supply, electric transmission, and land use. They convey the need to maintain a diverse portfolio of generation technologies with special attention to nuclear power. These recommendations also suggest increasing the reliability and adequacy of our fuel supply and electric transmission system, as well as land-use proposals to more efficiently accommodate future energy facilities.

### **Enhancing Florida's Energy-Related Education, Research and Development Programs**

Florida needs to establish a mechanism that encourages



knowledge and technology exchange between the universities, as well as with national energy laboratories and private industry. New energy-related technologies generated through Florida's public universities and research centers will not reach their full potential unless Florida creates a climate that supports technology transfer and its commercialization.

This report presents a series of recommendations intended to enhance Florida's energy-related education, research and development programs. Specific recommendations focus on the key areas of consumer education and workforce training, university research, market development, an annual research summit and coordination of Florida's energy-related research and development.

### **Developing Issues for the FEC's 2008 Report**

In the coming year, the Commission's approach will be distinctly different. The FEC will take a more narrow focus and concentrate on a limited number of critical energy-policy issues. The Commission will address several issues that have been major obstacles to implementing far reaching energy policy reform.

These recommendations include determining a dedicated funding source for energy-related measures, lowering transportation-related greenhouse gas emissions and reforming the way Florida regulates utilities in order to motivate utilities to encourage consumers to use less energy.

It has never been more important to have a strategic state energy plan than now. As with many things these days, we can never go back to the way they once were. A new plan is required by the increasing cost of fuel, the need for energy security and by environmental and climate change concerns. The availability and cost of fuel will never be the same. Not to plan, is a poor plan at best.



# Florida's Energy Profile

*Florida's phenomenal economic and population growth over the past century has fueled an extraordinary demand for energy. In response, the state's private and public energy providers have generally supplied Floridians with an adequate supply of reasonably-priced electricity and transportation fuel. As the energy industry has expanded and diversified, the state has developed a framework of regulatory entities and programs to ensure the reliable, affordable, and environmentally responsible delivery of energy. But in recent years, a number of energy-related concerns have emerged that could adversely impact Florida's economy and environment. Issues such as global climate change, energy security, continued growth and new infrastructure requirements pose significant challenges to the state and underscore Florida's need to reassess its energy-related policies. In order to effectively address these challenges changes are necessary both within the energy industry and the state's energy programs.*

## Key Energy Sectors

Florida requires a tremendous amount of energy to support its 18 million residents, 84 million annual visitors, and vibrant economy. According to the United States Energy Information Administration (EIA), in 2005 Florida consumed 4,452.5 trillion British Thermal Units (Btu) of energy, and currently ranks third nationally (after Texas and California) in total energy consumption. But Florida's per-capita energy consumption is among the lowest in the U.S. due to its relatively low industrial-sector energy use. EIA data shows Florida's energy use is concentrated heavily in the residential, commercial, and transportation sectors. More specifically, the vast majority of energy use in Florida is dedicated to electrical power for residential and commercial buildings and motor vehicle fuels.

## Electric Power Sector

**Customer Profile** - Florida's electrical customer profile is somewhat unique in comparison to other states. Based on 2006 data, residential customers comprise 89 percent of accounts and purchase 51 percent of all electrical energy sold. Commercial customers comprise 11 percent of accounts and 36 percent of all electrical

energy sold. Industrial customers comprise less than 1 percent of accounts and 10 percent of all electrical energy sold.

Florida's hot and humid weather causes high residential demand. Residential customers use a greater variety of energy amounts throughout the day than industrial customers. This results in more distinct early-evening summer peaks, and mid-morning and late-evening winter peaks. In contrast, Florida's industrial electrical energy use is lower and more uniform. This requires a much smaller load than the national average, where industrial customers consume 28 percent of electricity.

**Industry Profile** – Florida relies on 57 electric utilities which generally are identified by ownership type and fit into 1 of 3 categories:

- *Investor-owned Utilities*- Organized as taxpaying businesses and typically financed by the free-market sale of securities, these utilities are managed by shareholder-elected representatives. Florida's 5 investor-owned properties currently make up about 82 percent of its generating capacity, and include:

Table 1: 2006 Florida Summary Statistics (EIA)

Item	Value	U.S. Rank
<b>Florida</b>		
<b>NERC Region(s)</b>		<b>FRCC/SERC</b>
<b>Primary Energy Source</b>		<b>Gas</b>
<b>Net Summer Capacity (megawatts)</b>	<b>53,206</b>	<b>3</b>
Electric Utilities	45,184	1
Independent Power Producers & Combined Heat and Power	8,022	12
<b>Net Generation (megawatthours)</b>	<b>223,751,621</b>	<b>2</b>
Electric Utilities	200,015,227	1
Independent Power Producers & Combined Heat and Power	23,736,394	13
<b>Emissions (thousand metric tons)</b>		
Sulfur Dioxide	329	10
Nitrogen Oxide	212	3
Carbon Dioxide	126,529	3
Sulfur Dioxide (lbs/MWh)	3.2	31
Nitrogen Oxide (lbs/MWh)	2.1	29
Carbon Dioxide (lbs/MWh)	1,247	32
<b>Total Retail Sales (megawatthours)</b>	<b>228,219,544</b>	<b>3</b>
Full Service Provider Sales (megawatthours)	228,219,544	3
<b>Direct Use (megawatthours)</b>	<b>5,274,184</b>	<b>7</b>
<b>Average Retail Price (cents/kWh)</b>	<b>10.45</b>	<b>13</b>

### U.S. Energy Information Administration

Florida Power & Light Company (47 %); Progress Energy Florida (21 %); Tampa Electric Company (9 %); Gulf Power Company (5 %); and Florida Public Utilities Company (non-generating utility).

has 15 cooperatively-owned utilities, and two generation and transmission cooperatives, the largest of which is Seminole Electric Cooperative.

- *Municipally-owned Utilities* - Municipally owned and operated, these electric utility systems serve residential, commercial, and industrial customers, usually within their own boundaries. Florida has 34 municipally-owned utilities the largest of which are Jacksonville Electric Authority, Orlando Utilities Commission, City of Tallahassee, City of Lakeland, and Gainesville Regional Utilities. Additionally, the Florida Municipal Power Authority provides generation and transmission services to the smaller municipal systems.
- *Cooperatively-Owned Utilities* – These utilities are joint ventures organized to supply electric energy to a specified area. They generally are exempt from federal income tax laws, and most are financed by the Rural Electrification Administration. Florida

**Generation** - Currently, Florida's electric utilities have 56,038 megawatts (winter ratings) of installed capacity to meet customer demand. This figure includes 5,279 MW on non-utility and merchant capacity. Approximately 360 generation units operate at 79 plant sites around the state. To meet Florida's growing electric demand, state utilities plan to accelerate new power-plant construction. Over the next ten years, Florida will add about 16,338 megawatts (winter ratings) of new capacity. Utility demand-side management, energy efficiency programs and renewable electricity production also will continue to supplement new generation.

Florida's electric demand usually is highest in the summer. In 2006, summer peak electric demand hit 48,140 megawatts, and has increased an average 3.88 percent per year over the past decade, compared to winter peak demand, which reached 44,812 megawatts and has in-

creased an average 2.19 percent per year over the past decade. This increase in peak demand is due mainly to high population growth. Electrical energy consumption has grown an average 3 percent per year over the past decade, exceeding Florida's average population growth rate, indicating a continued surge in electricity consumption in the state.

The Florida Reliability Coordinating Council expects summer and winter peak demand to grow at an average annual rate of 2.39 and 2.36 percent, respectively, over the next decade. Total electricity consumption is projected to grow an average 2.74 percent per year over the decade.

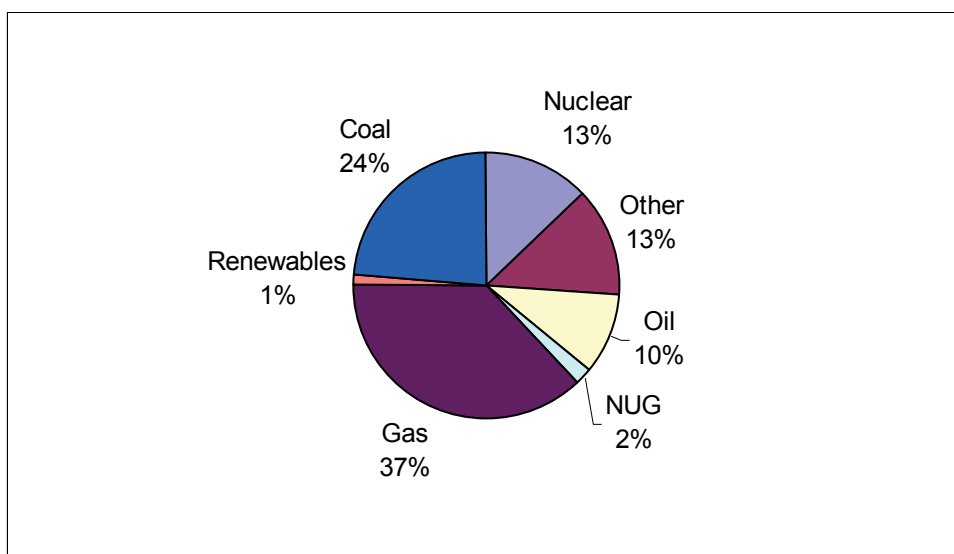
*Load Profile* - Florida's electric systems and utilities must build and operate various types of units to meet the state's changing load. Baseload generation meets the continuous load on the system, and mainly consists of large coal-fired and nuclear units. These units are expensive to construct, but less expensive to operate. As the load rises during the day, intermediate units, mainly oil and natural gas-fired, are brought on line and then lowered as the load decreases at night. These units may run for between 50 and 70 percent of the day and generally cost less to construct, but more to operate. Combustion turbine units, mostly oil- and natural gas-fired, are cycled on for shorter periods to meet peak demand and may only run between 5 and 20 percent of the day,

depending on weather conditions. Combustion turbine units generally cost the least to construct but the most to operate.

*Fuel Mix* - Presently, Florida's installed electric generating capacity is based on natural gas (37 percent) coal (24 percent), nuclear (13 percent), oil (10 percent), non-utility generators (2 percent), and renewable energy sources (1 percent). The preliminary 2007 Ten-Year Site Plans indicated that new generation capacity additions would be 80 percent natural gas-fired and 19 percent coal-fired. However, a number of proposed coal plants included in that estimate have recently been denied or withdrawn from the need certification process. As a result, it appears likely that natural gas will represent an even larger percentage of the future generation fuel mix.

Throughout the 1990s, Florida's utilities came to increasingly rely on natural gas as the primary electric-power-generation fuel. Florida utilities plan to meet much of their expected new demand by adding more natural gas capacity (See Fig. 1). Florida currently relies mainly on two major gas pipeline companies, Florida Gas Transmission (FGT) and Gulfstream Natural Gas (Gulfstream), to supply natural gas to electric utilities, industrial customers, local distribution companies and two smaller pipelines serving

Figure 1: State of Florida – 2007 Net Energy for Load (GWH)



Florida Reliability Coordinating Council

customers in the Panhandle (Southern Gas and Gulf South). Phase I of Southern Gas' recently completed Cypress pipeline project interconnects with FGT's pipeline near Jacksonville. This gives Florida access to Southern's Liquefied Natural Gas (LNG) facility near Savannah, Georgia.

**Transmission Infrastructure** - While generating units supply Floridians' energy needs, the transmission system is the backbone that delivers energy to end users. Utilities must coordinate their individual generation and transmission plans to ensure that adequate energy can flow from power plant sites to load centers statewide. Currently, the coordinated electric transmission system in Peninsular Florida has about 15,700 miles of transmission lines. Of this total, approximately 990 miles of transmission lines have been added since 2001. There are roughly 116,000 miles of distribution lines in the state.

*Interconnections with Other States* - Florida's geography limits its ability to import power from surrounding states. Before 1980, Peninsular Florida's limited transmission interconnections to the rest of the nation consisted of only a few Northwest Florida ties, and gave area utilities access to only 400 MW of imported energy. This made the region susceptible to disturbances when large generating units experienced unplanned forced outages. In 1982, two large transmission lines were constructed linking Georgia and Northeast Florida, increasing Peninsular Florida's maximum import capability to 3,600 megawatts, and support energy exports as high as 2,600 megawatts. The import capability normally equals about 7.5 percent of the region's peak demand.

*Reliability* - Electric utilities plan bulk power systems to comply with national and regional reliability standards. The Energy Policy Act of 2005 authorized a statutorily recognized electric reliability organization to enforce reliability-standard compliance among all market participants. The Florida Reliability Coordinating Council (FRCC) is authorized to ensure that Peninsular Florida's electric utilities meet federal reliability standards. The FRCC is in the process of developing a coordinated transmission-planning process among these electric utilities. Recent FRCC analysis indicates that Florida's current power distribution systems are generally reli-

able, although congestion in the central Florida region has been noted. To maintain a transmission system that can reliably meet increasing state electricity needs, Peninsular Florida's utilities plan to invest roughly \$1.7 billion in 1,109 additional miles of transmission lines over the next five years.

**Energy Efficiency and Conservation Initiatives** - The Florida Energy Efficiency and Conservation Act (FEECA), established in 1980, emphasizes reducing weather-sensitive peak electric demand growth rates, reducing and controlling electricity consumption growth rates, and reducing fossil-fuel consumption. Where beneficial to all utility customers, the Florida Public Service Commission encourages conservation and demand-side management programs. The Commission sets numeric peak demand and energy savings goals for the seven large electric utilities subject to FEECA, and monitors their conservation achievements.

Since FEECA's enactment, utility-sponsored demand-side management (DSM) programs have reduced statewide summer peak demand by roughly 5,332 megawatts and winter peak demand by 5,655 megawatts. Demand savings from these programs deferred the need for ten typical 500 megawatt electric generating plants, or enough energy to serve about 1.6 million households.

Florida's investor-owned utilities offer various residential and commercial conservation programs to customers. Before they can recover costs, investor-owned utilities must show each program to be cost-effective not only to the participating customer, but to the general body of ratepayers as well. In special circumstances, the Commission may approve programs that affect rates minimally, but offer a large energy-savings potential.

**Renewable Energy** - Currently in Florida, renewable generation facilities fuel over 1,100 megawatts using biomass, hydroelectric sources, waste heat, landfill gas, and municipal solid waste. Florida's electric utilities purchase just over 500 MW from these sources to defer the need for new power plants. Other facilities also produce over 610 megawatts of energy for internal use (self-service) or to sell to utilities on an as-available basis. As a result, the state's utilities do not count on this internal-use energy for reliability purposes, but when available, this energy can help a utility avoid burning fossil fuels from existing generators.



# Transportation Sector

Transportation, Florida's second largest energy-use sector, comprises more than a third of energy consumed in the state. Florida ranks third nationally in gasoline consumption, depends almost exclusively on other states and nations for oil and gasoline supplies. Florida consumes 10.3 billion gallons of gasoline and diesel fuel annually, and requires 300 million more gallons every year. Florida demands 28.7 million gallons of transportation fuels per day, not including aviation fuels. Motor gasoline and diesel fuel comprise over 87 percent of Florida's transportation energy costs. Aviation fuel accounts for less than 10 percent.

**Conventional Fuels** – Florida's negligible crude oil production and lack of native refinery capacity make it dependent on imported motor fuels. Florida receives fuel from domestic and international refineries and a pipeline spur in Georgia. Ninety-eight percent of Florida's fuel comes by sea via barge and tanker ship into seven ports. The remaining two percent is delivered by tanker truck from other states. About 1,000 tanker trucks under various commercial arrangements transport fuel from bulk storage to more than 8,000 retail gas stations in Florida. Fuel distribution varies based on supply and demand and petroleum companies' and suppliers' business objectives.

**Alternative Fuels** – Petroleum-based fuels dominate the market, but a variety of alternative fuels are increasingly available. More than 12 alternative and advanced fuels are in production or use today. Government-owned and voluntary private fleets are the primary alternative-fuel users, but consumer interest in these fuels is growing.

**Ethanol** – A flammable, colorless chemical compound, ethanol is one of the alcohols most often found in alcoholic beverages. The most widely used renewable biofuel, its main use is to enhance vehicle performance, and to improve the emissions profile of gasoline. Currently, most (97 percent) of the ethanol produced in the U.S. is made from corn. Dedicating all U.S. corn and soybean production to biofuels would meet only 12 percent of gasoline demand and six percent of diesel de-

mand. Florida is pursuing cellulosic ethanol technologies to produce ethanol from Florida-based biomass like sugarcane byproducts (bagasse) or citrus peels.

The Federal Energy Policy Act (EPA) of 1992 largely drives ethanol demand, as it requires public and private vehicle fleets which operate in selected areas to acquire and operate Alternative Fuel Vehicles (AFV). Nine Florida areas are subject to EPA standards. Florida currently has 18 ethanol fueling stations open to the public and 4 ethanol distributors/haulers serving the state's demand. Florida currently has no operational ethanol plants, but, plans for facilities are well underway.

Currently, there are nearly 50 ethanol fueling stations selling E10 (a 10 percent blend of ethanol) in Florida open to the public and four ethanol distributors / haulers serving demand in Florida. Florida currently has no operational ethanol production plants in the state; however, there are plans for two commercial facilities producing corn-based ethanol in the Tampa area with a combined production capacity of 75 million gallons per year. Three pilot projects funded partially by state funds will produce ethanol from waste materials such as citrus processing waste, yard, wood, and vegetative wastes. Florida ethanol supplies are currently obtained by imports from refineries outside of the state.

**Biodiesel** - A biodegradable transportation fuel for use in diesel engines that is produced through processing of organically derived oils or fats. Biodiesel is typically used as a small blending (five percent to 20 percent) component with diesel fuel. In the future it may supplement diesel fuel supplies in more significant volumes than the current level (less than one percent of the diesel supplies) both in Florida and nationwide.

**Hydrogen** – The simplest and most abundant element in the universe, hydrogen can be made from fossil fuels, biomass and even by electrolyzing water. Producing hydrogen with renewable energy and using it in fuel-cell vehicles holds the promise of virtually pollution-free transportation and independence from imported petroleum. Unfortunately, several technological issues associated with hydrogen's use as a transportation fuel must be addressed before it can become a significant



part of Florida's transport fuel portfolio. Hydrogen production is expensive, and the best source currently is reformed natural gas. It is also explosive and presents multiple safety issues. Finally, storing adequate quantities of hydrogen onboard to approximate the range of current vehicles has proven challenging.

## State Energy Policy Governance

The state currently has a number of governmental entities that develop and implement energy policy. Prior to 1973, state energy laws focused mainly on utility regulation. In the wake of the 1973 Energy Crisis, Florida enacted a number of new programs intended to take a more comprehensive approach to state energy policies and programs. More recently, the Energy 2020 Commission was created in 2000 to review state energy policies, including the prospect of utility deregulation. In response to the devastating 2004/2005 hurricanes and related economic impacts, the Department of Environmental Protection developed Florida's first energy plan in 2006. Responsibility for the administration of the state's key energy programs is distributed among the following agencies.

**The Florida Public Service Commission** - The Public Service Commission (PSC) is authorized to ensure consumers receive adequate, reliable, reasonably priced electricity. The PSC has specific authority to regulate investor-owned electric utilities' rates and service. It oversees the electric grid's reliability, determines the need for new electric generating facilities, establishes utility conservation goals and oversees electric-facility safety. The PSC can set rates of natural gas utilities that serve end-use customers. The PSC must affirm the need for proposed intrastate natural gas pipelines before construction. The PSC also inspects natural gas facilities to help ensure safe operations.

**The Florida Department of Environmental Protection** - The Department of Environmental Protection (DEP) administers Florida's environmental regulatory programs with respect to economy-wide energy production, transportation, and use. Instances of the environ-

mental and energy interface include pipeline resource permitting, power-plant permitting for air pollution control, and oil-drilling permitting. The Florida Energy Office's 2003 transfer to DEP from the Department of Community Affairs added new energy-policy duties such as analytical support for policy development, renewable energy promotion via grants and rebates, and providing public technical assistance.

**Department of Agriculture and Consumer Services** - The Department of Agriculture and Consumer Services (DACS) plays a key role in Florida's energy policy through its mission to protect consumers and market agricultural products to benefit Florida's economy. The Department runs the Farm to Fuel Initiative to enhance the market for and promote producing and distributing renewable energy from Florida-grown crops, agricultural wastes and residues, and other biomass; and to enhance agriculture products' value and expand agribusiness for Florida. The DACS regulates the quality and measurement of petroleum products sold in Florida.

**Department of Community Affairs** - The Department of Community Affairs (DCA) is the principal clearinghouse for community concerns in Florida including growth management and the administration of state and federal grant funds allocated for use at the community level. The DCA houses the Florida Building Commission which develops and maintains the Energy Efficiency Code for Building Construction, a state minimum-energy conservation code. The DCA also regulates the minimum energy efficiency of certain consumer appliances sold in Florida, including refrigerators, freezers, and lighting. The DCA also administers two federally funded programs (the Weatherization Assistance Program and the Low Income Home Energy Assistance Program) that provide grant funds to local governments and non-profit agencies to provide energy-related assistance to low-income families.

## Florida's Energy-Related Challenges

The State of Florida is confronted by a number of energy-related challenges that could significantly impact Florida's economy and environment. For example, evolving federal and state policies relating to green-

house gas emissions will have major implications for energy producers and consumers. Addressing these challenges will require the long-term commitment of state resources and the development of innovative solutions. However, these concerns also pose opportunities to realize potential benefits, particularly in the area of economic development. How Florida responds to these challenges and opportunities will help shape nearly every aspect of the future of our state for generations.

**Energy Security** – The United States' growing dependence on oil, particularly foreign oil, carries significant economic and security risks. The prevailing combination of tight oil supplies and high, volatile prices will likely continue, given trends in global consumption, continuing instability in major oil producing regions, and a global decline in spare production capacity. Similar price and supply worries apply more and more to natural gas markets where sustained price increases and extreme volatility reflect a widening gap between domestic supply and demand. The security of the infrastructure and continuity of energy supplies also are threatened by catastrophic natural disasters, global terrorism and other hazards. The federal government continues to assess the nations' vulnerability to a range of threats and develop strategies to provide a more secure energy future.

Florida's unique geography and lack of native resources renders it particularly vulnerable to energy-supply disruptions. The catastrophic 2004 and 2005 hurricane seasons underscored this vulnerability and the resulting economic impacts. The hurricanes severely disrupted vital natural gas supplies to Florida. The state has since worked to enhance its energy infrastructure's security. Similarly, Florida's increasing dependence on natural gas for electricity is of growing concern. Forecasts show new generation capacity proposed over the next ten years will be almost entirely natural gas-fired. Excessive reliance on a single fuel leaves Floridians subject to price-volatility and supply-interruption risks.

**Climate Change** – While the world's scientific community continues to assess climate change's potential impacts, the clear consensus is that increasing greenhouse gas concentrations are causing global temperatures to increase. Moreover, the Intergovernmental Panel on Climate Change (IPCC) recently found that most of the observed increase in global temperatures since the mid-20th century is very likely due to the increase in man-made greenhouse gas concentrations. If green-

house gases continue to increase, climate models predict the Earth's average surface temperature could rise from 3.2 to 7.2°F above 1990 levels by the end of the century. Sea level rise is projected from 7 to 23 inches (excluding potential ice sheet flow) during the same time period. Scientists have observed some already occurring changes such as sea level rise, shrinking glaciers, changes in plants and animal range and distribution, earlier-blooming trees, longer growing seasons, river and lake ice freezing later and breaking up earlier, and permafrost thawing.

Florida's 1,350 mile coastline makes sea-level change a major concern. The projected sea level rise would force Florida's coastal cities to incur major costs to build seawalls and flood-control structures. The state also could lose significant beachfront property and suffer greater storm damage from higher storm surges and more intense hurricanes. But rising sea levels are just one of many possible threats posed by climate change. Florida could see dramatic increases in health-related concerns, rainfall changes, coral-reef damage, and negative impacts to fish and wildlife. In the short term, global climate change may enhance Florida's agricultural production due to warmer temperatures and longer growing seasons. But in the long term, global climate change could lead to lower yields of critical economic crops such as citrus, sugarcane and tomatoes due to rising temperatures, precipitation changes, and fresh-water shortages.

It must be said that much uncertainty still surrounds climate change and the appropriate state policy response. Climate science is incredibly complex and evolving, and many proposed greenhouse-gas mitigation actions pose significant costs. Congress continues to debate various proposals to establish a national policy to address climate change, including a number of greenhouse gas cap-and-trade schemes. International negotiations have begun on a successor treaty to the landmark 1997 Kyoto Protocol. One certainty is the fact that Floridians are increasingly looking to state policymakers to provide leadership on this critical issue.

**Additional Concerns** – While energy security and climate change continue to garner headlines, several less visible, but equally important energy-related concerns warrant state decision-makers' attention.

- **Energy Policy Governance** – An issue of continuing concern is Florida's fragmented energy policy. Currently, responsibility for the state's energy-related programs is distributed among numerous agencies, with limited coordination and accountability.
- **Energy Costs** - Florida's energy consumers and producers have recently experienced significant energy cost increases. The price of oil hovers near \$100 per barrel, and gasoline prices have surpassed \$3 per gallon. After nearly two decades of relatively flat electricity prices, the cost of electricity is rising. The escalating cost of natural gas is affecting both energy consumers and producers.

• **Fuel Diversity** – Economic and environmental uncertainty caused by emerging federal and state greenhouse gas policies has prompted the cancellation of multiple coal-fired generation plants, and left more than 4,000 megawatts of proposed capacity to replace. If natural gas becomes the substitute fuel, Florida's dependence on natural gas as a generation fuel source will be further exacerbated.

- **Growing Demand** – Continued energy-demand growth, coupled with uncertainty about new generation sources and technologies, raises questions about how the state will meet long-range energy needs. A more specific concern is the underutilization of energy efficiency and conservation programs.
- **Energy Infrastructure** – Florida's energy providers will need to invest billions of dollars in new infrastructure over the next several decades and are likely to deploy new and diverse technologies. Significant challenges associated with siting and integrating these new energy systems will likely arise.
- **Aging Workforce** – Nationally, electric utilities project that up to 50 percent of their workforce will retire within ten years, and an aging workforce is among the three top concerns of U.S. utilities. Three quarters of Florida's electric systems cite the accelerated pace of retirement as a major concern.

economic development opportunities for the state. The consensus is that energy production and consumption trends will be fundamentally transformed over the next 50 years. Many observers expect hydrogen-based energy technologies to eventually supplant fossil fuels. But a number of technological barriers will likely delay for decades hydrogen-based energy systems' widespread deployment into the marketplace. In the meantime, a growing number of alternative energy technologies represent promising transitional options. Fortunately, Florida has the potential resources and technological/scientific expertise to be a leader in several alternative energy fields. By capitalizing on these advantages the state can position itself to realize significant economic development benefits.

With oil prices surging and increased attention to global warming, venture capitalists are straying from their traditional information technology and biotechnology focus to funnel funds (almost \$3 billion in 2006) into alternative-energy companies. Florida's most promising alternative energy sources include biomass, solar and ocean energy.

- **Biomass** - With 15 million acres of forest land, 10 million acres of farm land, and a year-round growing cycle, Florida accounts for 10 percent of the nation's potential biomass resources. The Department of Agriculture and Consumer Services estimates that the approximately 124 million dry tons of biomass available in Florida could produce upwards of seven to 12 billion gallons of cellulosic ethanol. Research at the University of Florida and the Department's *Farms to Fuel* initiative are expediting the development of cellulosic ethanol and other promising bio-fuels commercial application.
- **Solar** - As the "Sunshine State," Florida is strategically positioned to take advantage of the tremendous world-wide growth in the solar energy industry. Solar thermal applications are cost-competitive now, and the cost photovoltaic systems are predicted to be reduced by half as early as 2015.
- **Ocean** - Florida's location makes it ideally suited to harness thermal energy from the ocean, and through underwater turbines, capture energy via ocean currents. The current ocean energy resource of Florida have a potential generating capacity in excess of 10 gigawatts, equal to some 10 nuclear power plants.

**Economic Development Opportunities** – Florida's significant energy-related challenges also could equal

Florida is primed for alternative energy growth as its universities and research centers already are recognized leaders in many of these areas. By strengthening the state's commitment to these and other promising alternative energy sources, and encouraging investment in related technologies and infrastructure, Florida can create thousands of high-skill, high-wage jobs, and change the state from an energy importer to energy exporter.





# **Restructuring the State Governance for Developing Florida's Energy Policies and Programs**





# Restructure

## Florida's Energy Policy and Program Governance

*It is recommended that the Florida Legislature create a new infrastructure within state government for the development of a state energy and climate policy as outlined in this recommendation. The FEC would become an independent executive/legislative commission located in the Department of Environmental Protection\* and have enhanced responsibilities with the purpose of being an independent organization within state government.*

*The FEC would operate as an independent commission and make recommendations to the Governor, the Speaker of the House and President of the Senate. The FEC's recommendations shall be guided by the principals of energy reliability, efficiency, affordability, diversity and environmental quality. The DEP Secretary shall be responsible for providing additional staffing to the FEC upon its transfer to DEP to enable the FEC to adequately address its additional responsibilities. Its membership would be;*

*6 public members appointed by the Governor, with one designated as chair,  
3 public members appointed by the President,  
3 public members appointed by the Speaker  
for a total of 12 members, and  
one member of the Senate, ex officio, appointed by the Senate President, and  
one member of the House, ex officio, appointed by the House Speaker.*

*The ex officio members, and the Chair of the PSC, the Public Counsel, and the secretaries of DEP, DCA and DOT, the CFO and the Commissioner of Agriculture would be non-voting members of the Commission.*

*Current membership would be replaced as member's terms expire. New terms would be for three years. Members could be reappointed with no limitation on how long they can serve. The 12 appointed public members, including the chairperson, would require Senate confirmation.*

*New responsibilities for the FEC would include making recommendations to the appropriate entity for grant awards and authorizing incentive programs from appropriated monies, public awareness advocacy, and conducting education and academic summits. The FEC would work closely with other state agencies to ensure that Florida's climate and energy policies are properly implemented. Existing statutory responsibilities, with some clean up, would continue, as well as making policy recommendations to the Governor and Legislature.*

Continued on next page

*Additionally, both the DEP and Public Service Commission shall be responsible for review and determination as to the suitability of the 10 year site plan for each electric utility.*

*\*The agency within which the FEC is located could be either DEP or DCA.*

## Unified Energy Governance

### Creates Accountability and Efficacy

The rationale for a new energy and climate policy development process has never been more important to the future of our State. With the evolving nature of the energy sector and climate change concerns, the current method for developing and implementing energy policy appears to be inadequate.

There are various state entities that have regulatory or policy responsibility over some aspect of the utility, energy or climate change question. The Florida Public Service Commission is a legislative entity charged with setting rates for the investor owned electric utilities. The Governor and Cabinet sitting as the Utility Siting Board grant certificates for power plants, electric transmission facilities, and natural gas transmission pipelines. The Department of Agriculture administers the Farm to Fuel Initiative that promotes the production of renewable energy from Florida grown crops. The De-

partment of Community Affairs plays a role in building efficiency standards, appliance efficiency standards, and weatherization programs. The Department of Environmental Regulation administers Florida's environmental regulatory programs with respect to energy production and transportation. The Florida Energy Office within DEP provides public information and administers federal and state grant funding for advanced clean energy sources and energy conservation and efficiency.

What does need to occur is the deletion of redundancies and streamlining of the process to create a smooth flow of responsibilities with accountability across agencies or entities with a strong focus on effectiveness. The new commission would be the State's premier energy policy formulating board, making recommendations to the Governor and the Legislature and implementing the programs statutorily assigned to it.



# Responding to the Challenges of Global Climate Change



# Introduction

The clear message heard by the Florida Energy Commission (FEC) this past year is that the world's climate is warming in large part due to human activities, that Florida is especially vulnerable to the effects of climate change, and that it is time for Floridians to tackle climate change. Speakers brought this statement to the Commission from all sectors of our society, including academicians, business leaders, utility company experts, environmental advocates, politicians and private citizens. Floridians are looking to their government to help them take the first steps to prevent climate change and to adapt to its effects. Floridians also want their government to facilitate a transition to a cleaner, healthier, energy efficient economy.

The facts for a changing world climate come from direct temperature measurements collected over the past two centuries and from indirect assessments taken from historical records, from tree ring widths, from stalactite composition, and from Arctic and Antarctic ice cores. The ice core measurements offer the most telling and definitive long-term record. Atmospheric carbon dioxide is trapped in polar ice when snow falls. The trapped carbon dioxide can be measured by today's scientists to chronicle the levels of atmospheric carbon dioxide and the levels of the world's temperature going back across 650,000 years.

The major greenhouse gases (GHG) are carbon dioxide (released primarily from the burning of fossil fuels), methane (from garbage dumps, natural gas leaks and domestic animals), and several industrial hydrocarbon and nitrate gases. Carbon dioxide (CO<sub>2</sub>), by far the most important GHG, persists in the atmosphere for decades where it traps the sun's heat and prevents its from radiating back into outer space. The factual existence of climate change is a matter of simple chemistry: as CO<sub>2</sub> rises so does the temperature.

The world's climate data has been catalogued by an international organization, the Intergovernmental Panel for Climate Change (IPCC), winner of the 2007 Nobel Peace Prize. The 2007 IPCC Assessment indicates that for 620,000 years prior to the Industrial Revolution there were natural fluctuations in carbon dioxide between 180 and 300 parts per million (ppm). Since 1800, carbon dioxide levels have gradually increased,

reaching 380ppm in 2005, far beyond the highest levels spanning many geological eras, ice ages, and previous warming periods. Most worrisome is that the Industrial Revolution's 1.1 percent annual growth in carbon dioxide atmospheric levels leapt for 2000-2004 to a 3 percent annual growth, according to the proceedings of the U.S. National Academy of Sciences.

The average world temperature rose 0.76 degrees Celsius between 1850 and 2005, and the IPCC predicts a 1.8 - 4.0 degree Celsius rise by 2100. To place this in context, the last time the world was 3-5° degrees Celsius warmer than present, about 125,000 years ago, the polar ice sheets melted and sea levels rose 4-6 meters. Most of peninsular Florida was submerged for millennia.

Florida is graced with warm sunshine that is the envy of our northern neighbors. But as the temperature warms in the coming decades we will experience increasing more sweltering days and intensely violent storms. Approximately 80 percent of us live at low-lying elevations within 20 miles of the ocean where we are highly susceptible to rising seas. Other environmental concerns include saltwater intrusion into fresh water wells, losing our coral reefs and fisheries as the seas become more acidic, the extinction of species of great natural beauty and with pharmaceutical benefits, and the emergence of tropical diseases such as malaria and dengue fever.

Both the legislative and executive branches of our government have acknowledged Florida's role as part of the problem. If considered a nation, Florida would be the world's 26th worst greenhouse gas emitter. The Legislature created and charged the Florida Energy Commission to "...recommend consensus-based public-involvement processes that evaluate greenhouse gas emissions in this state..." The Commission also applauds Governor Charlie Crist for his July, 2007 Executive Orders that propose his initial steps to curtail greenhouse gas release in Florida.

The Commission's comprehensive 2007 recommendations related to climate change focus on 4 areas. First, the FEC recommends adopting farsighted targets for reducing Florida's greenhouse gases, and including processes for deciding how to achieve these and other

climate-related targets. Second, the FEC recommends that all levels of government promote developing clean energy technologies through “Lead by Example” policies whereby government purchasing and management decisions foster new industries and create new jobs. Third, the FEC advocates an extensive list of education and research programs to help inform our citizens and to boost climate and energy research. Fourth, the FEC recommends ways to reorganize state climate and energy policymaking for better efficacy and accountability.

The decisions of Florida’s citizens over the next generation will determine whether we succeed at responding to today’s climate and energy challenges. The measures proposed in this report begin this essential journey.



# 2

## Establish

### Greenhouse Gas Emission Targets

*It is recommended that the Florida Legislature adopt long-term reduction targets for GHG emissions. The initial targets should be as follows: by 2020 to reach 2000 emission levels; by 2030 to reach 1990 emission levels; and by 2050 reduce emissions to 80 % below 1990 levels. These GHG emission targets will be subject to sunset review in 2013, which would require the FEC and the Legislature to reassess the relevant concepts, science, economics, and policies. The FEC would also be required to provide an annual assessment report. These initial emissions targets are intended to provide guidance in the state's long-term response to global warming, and as such, do not specify or require implementing policies. Specific policies to achieve reductions in GHG emissions should be developed through the FEC utilizing a consensus-based, stakeholder-driven process.*

### Emissions Reduction Targets

### Guide Climate Change Response

Several thousand scientists worked together on the Intergovernmental Panel on Climate Change to review the exhaustive evidence of global warming and describe the plausible range of outcomes. They agree that global warming caused by greenhouse gas emissions from human activities represents a profoundly serious threat to civilization and to the most robust and insulated natural ecosystems.

Carbon (CO<sub>2</sub>) makes up the overwhelming majority of greenhouse gases. The second most prominent GHG is methane (CH<sub>4</sub>), which is emitted in far lower quantities, but is more potent than CO<sub>2</sub>. The other commonly recognized GHGs are nitrous oxide (NO<sub>2</sub>), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). Our state ranks 5th nationally in the amount of energy consumed per capita and 3rd in total energy consumption. Almost 1,000 people move to our state every day. To do nothing about GHG emissions is to leave the next generation of Floridians with the task of dealing with this issue that threatens their world. The cost to adapt and remedy these problems likely will be much higher for our future generations than if Florida begins to mitigate GHG releases today.

This recommendation directs the FEC to study Florida's economic, political and environmental conditions, and to make recommendations as the science of climate change and technical options evolve. Targets for emissions reductions are usually phased in over a deter-

mined number of years at specific reduction levels. Targets are based on levels that are necessary to achieve stabilization of the GHGs at some certain point. For example, the Committee on the Environment and Northeast International Committee on Energy of the Conference of New England Governors and Eastern Canadian Premiers created a long-term goal of a 75-85% reduction thought to be required to stabilize GHG global levels at twice their preindustrial levels.

The two most prominent market based greenhouse-gas reduction strategies are the cap- and-trade structure and the carbon-fee structure. Each strategy requires a central entity to place a monetary value on carbon emissions; however a cap-and-trade approach also limits the total amount of carbon that can be emitted, resulting in a carbon market and a carbon market price that rises and falls based on the available units and the demand for those units. A carbon fee places a set price on a limitless amount of carbon emissions.

The U.S. acid rain crisis in the 1990's led to a cap-and-trade program for sulfur dioxide (SO<sub>2</sub>) emissions. As a result, SO<sub>2</sub> emissions were drastically reduced. Cap-and-trade proponents believe the same would result if a market price were applied to carbon within a cap-and-trade approach. Proponents of carbon fees claim that a fee system will require far less complex administrative systems.



## 3

## Measure

## Florida's Greenhouse Gas Emissions

*It is recommended that the Florida Legislature support Florida's participation in "The Climate Registry", which Florida joined as a founding member in May 2007; that the Legislature direct the Department of Environmental Protection to maintain a greenhouse gas registry and inventory; that reporting to the DEP be required for state government and utilities; that reporting be optional for county governments and other businesses; that DEP seek ways to assist local governments, counties, and businesses to participate in the registry and inventory; and that the Legislature provide statutory and budgetary support to the Department of Environmental Protection to implement these functions. The DEP will adopt methodologies for the recording and monitoring of emissions of greenhouse gases and to maintain a ledger to record future reductions in emissions.*

## Measuring and Reporting Greenhouse

## Gases is a Crucial First Step

Inventory, reporting, and registry systems are necessary tools for the implementation of greenhouse reduction plans because they support the State's action plan, targets, and regional leadership role.

Before being able to reduce GHGs, it is axiomatic that the sources and amounts must first be identified. Tracking and reporting of GHGs will be the basis for the construction of state GHG inventories. It is a precursor for sources to participate in voluntary or mandatory programs, opportunities for recognition, emission reduction registries, and to secure baseline numbers. In addition to identifying reduction opportunities, measuring and reporting can reduce risks associated with possible future GHG mandates. An accurate inventory, therefore, is critical to ensure that decisions are based on real emissions and emission reductions.

In developing reporting requirements, DEP should make every effort to build upon the considerable work already done on reporting structures, issues, protocols, and methodologies in order to maximize consistency and reciprocity with other jurisdictions' reporting pro-

grams. In doing so, Florida could influence GHG reporting practices in the Southeast region as well as the rest of the nation.

Any registry developed should provide guidance to help participants, provide appropriate transparency, and include a "transaction ledger" that has the capacity to support tracking, management, ownership, and exchange of emissions reductions.

The Governor in Executive Order 07-126, requires each agency under his direction to conduct an immediate assessment of energy used by their facilities during the last fiscal year. The agencies are to quantify the associated greenhouse gas emissions using the GHG Protocol Corporate Standard templates as developed by the World Business for Sustainable Development. Baseline figures are to be posted on the Florida Governmental Carbon Score Card and updated quarterly.

# 4

## Institute

### State Government Leadership Programs

*It is recommended that the Florida Legislature adopt statutory “Lead by Example” initiatives to help state, county and local government save on energy costs while promoting energy efficiency and clean energy technologies to the public and private sectors. This will include that all new state government buildings be built in compliance with LEED, Green Globes, or any other nationally recognized and verified standard. State buildings will be required to be operated in an energy efficient manner using policies that would be proposed by the FEC and implemented by the FEO and other state agencies.*

### State Leadership Programs

State leadership programs help state and local governments save substantially on energy costs while promoting energy efficiency to the public and private sectors by using available clean energy technology to construct and operate buildings.

Florida has taken strides toward forming an energy policy over the last two years. In 2006, the Legislature created the Florida Energy Commission. The 2007 Florida Legislature supported HB 7123, similar to this recommendation in that it promoted adopting LEED standards for constructing new state-owned buildings, renovating existing state-owned buildings, and enhancing state-building energy efficiency. Among other things, HB 7123 also prohibited constructing state-owned buildings without life-cycle cost analysis based on sustainable building rates, and established guidelines for deferred-payment options as incentives to assist in absorbing the cost of energy-efficient building materials or upgrades.

Likewise, the Green Building Initiative, a 501(c) 3 not for profit corporation, was founded in 2005 to accelerate green building practices by introducing credible and affordable green building design and assessment tools for commercial and residential buildings. The GBI promotes a commercial building rating system called Green Globes and the Model Green Home Building Guidelines assessment tool for residential builders which was created and maintained by the National Association of Home Builders.

### Save Energy and Money

The same year, Gov. Crist raised the bar by filing Executive Order 07-126, which goes farther by requiring agencies under his direction, and encouraging all other agencies, to take immediate steps in the areas of procurement, facilities and fleet maintenance to reduce greenhouse gas emissions. The order places much of the related administrative functions in the Department of Management Services.

Arizona recently passed legislation instituting state-leadership policies. Its policy directs agencies and universities to reduce energy use per unit of floor area by 10 percent by 2008, and again by 15 percent by 2011. It also requires them to purchase EnergyStar or Federal Energy Management Program-designated energy-efficient products and to meet conservation standards developed by the Arizona Department of Commerce’s Energy Office.

Arizona also allows school districts to establish energy efficiency funds with monies deposited by utilities, and to use the funds to buy energy-efficient products and services. Schools then could use utility bill savings to repay the capital costs of energy efficiency measures. The bill also allows schools to retain up to 20 percent of savings as an incentive, and to use the remainder of savings to pay loan installments. At the end of the loan term, the school then retains 100 percent of the savings.

## 5

# Establish

## The Florida Green Business Certification Program

*It is recommended that the Florida Legislature instruct the FEC to create a Green Business Program. This program should be coordinated with similar programs already available through other state agencies. It should create criteria for a business of any kind to be recognized and rewarded for adopting sound energy use and environmental practices, including reporting its carbon footprint and taking measures to reduce it. A business would achieve a graded award depending on the level of carbon emissions reductions that has been achieved. This program should provide plaques and window displays when a business has qualified for certification.*

“Going Green” is Good for

Business and the Environment

“Going green” has become a moral issue for many consumers who would rather patronize businesses they perceive to be environmentally conscious. Florida has already addressed this in the lodging industry, and this recommendation would offer this program to other industries.

Since 2004, The Florida Department of Environmental Protection has recognized environmentally conscious lodging facilities with the “Green Lodging Designation.” The program is voluntary and recognizes lodging

facilities that demonstrate water and energy conservation, waste minimization, recycling, indoor air quality, environmentally friendly purchasing, program sustainability and pollution prevention. Hotels and motels implementing “green” practices not only save money, but also generate good publicity while helping to protect the environment. The principles of this program transfer to many other industries.

## 6

# Establish

## The Florida Climate and Energy Finance Fund

*It is recommended that the Florida Legislature establish the “Florida Climate and Energy Finance Fund” to finance the investment in new energy-related projects in the state that have a life-cycle value that is positive. The fund should be available to both public and private sector projects. The Fund would be financed by a State bond fund and operated by the Florida CFO, whose managers assess the financial viability and energy performance of applications for financing. Projects qualifying to receive financing from the Fund should result in a net financial savings due to overall decreased energy costs. This is not recommended to be a deficit fund, but rather a fund that is debt-financed, that collects returns, and that can reinvest those funds in economic projects. As such there should be no net taxpayer funding.*

*Among other uses, this fund could be used for financing for commercial building projects (new, renovated or remodeled space) that build above current building code standards resulting in energy consumption per unit floor area of at least 10 percent less than it would be if the project merely met the existing code standards.*

## Providing a Return on Florida’s

## Investments Makes Sense

Florida, like many other states, provides incentives and grants for energy related projects. There are always issues of availability of public funds for such purposes and whether the State should receive a return on a project should it become viable and profit making.

This recommendation addresses that situation by creating a funding mechanism that once initial “seed money” is provided, in this case by state bonds, the fund can collect a return on its investment and continue to finance new projects.

A popular method of supporting energy projects has been the use of so-called public benefit funds. Almost half of the states have established one. Monies to support such type of fund normally come from a small charge on the customers’ utility bill or from the utilities. A public benefits fund does differ from the funding mechanism being recommended in that customers usually are the source for the money and the assessment is, for the most part, permanent. Nor do such funds seek a return on its investment which would then be used to fund new projects.



## 7

# Monitor

## Government Vehicle Practices and Renewable Fuel Use

*It is recommended that the Florida Legislature require State agencies to assess their transportation-related energy use, including fleet fuel analysis of automobiles and light trucks by class; and require all agencies to perform scheduled vehicle maintenance (such as assuring appropriate tire pressures and tread; replacing fuel and emission filters at recommended intervals; changing motor oil; and performing timely vehicle tune-ups).*

*The Legislature can require the Department of Management Services to measure and report compliance through the Equipment Management Information System database and to report annually; require agencies to use ethanol and biodiesel when locally available, and take steps to encourage the feasibility of developing renewable fuel vehicle fueling facilities for government and private sector vehicles.*

## Fleet Efficiency Policies

### Set a Good Example

State government is Florida's largest employer, with 114,756 employees. State government occupies 16.8 million square feet of space and makes more than \$1 billion in annual commodity purchases. Small changes at this level have the potential to make large differences.

In itself, this recommendation works as part of a "state leadership" incentive, and as a stand alone recommendation to make the vehicles paid for by state citizens work in the best interests of their environment and health.

Governor Crist's Executive Order 07-126 addresses this, and orders all state agencies under his direction to

assess transportation energy use utilizing a report that analyzes average fuel economy levels of the agencies automobiles and light trucks by class. The orders require the results of this baseline assessment to be posted on Florida's Governmental Carbon Scorecard, by agency, by October 1, 2007 and updated quarterly.

Many versions of government-fleet efficiency policies are in use in many states. Authority is needed. As a motivator, part of the revenue stream from enforcement could be allocated to the enforcing agency's budget.

# 8

## Create

### Vehicle Idling Rules

*It is recommended that the Florida Legislature direct the State to create standards for responsible vehicle idling in order to minimize fuel waste, air pollution, and greenhouse gas release by cars and trucks. The State will also conduct a study that will include the feasibility of providing back-up power for commercial trucks at Florida's truck stops in order to minimize idling at these locations.*

## Idling Limits Help to Reduce Greenhouse Gas Emissions

Reducing idling by diesel and gasoline engines reduces emissions of greenhouse gases and other toxic chemicals, and results in fuel savings.

Enforcing idling limits also presents specific issues. In Arizona, the policy was difficult to enforce due to a lack of enforcement funding and authority. In order to properly enforce idling limits, a dedicated funding stream and an agency with proper enforcement authority are needed. As a motivator, part of the revenue stream from enforcement could be allocated to the enforcing agency's budget. Overall weather conditions, especially summer temperatures in Florida, also raise concerns regarding overall comfort as well as safety and health.

Gov. Crist orders the Secretary of Environmental Protection to adopt a diesel vehicle idling reduction standard in the 2007 Executive Order 07-127. This recommendation goes a step further by addressing both diesel and gasoline engines.

Various versions of idling restrictions currently exist in more than 30 states. Implementation methods include information and education, technical assistance, codes and standards, pilots, reporting and enforcement. Time limits range from as little as three minutes to as long as fifteen minutes or longer.

## 9

# Capture

## Methane from Landfills and Wastewater Treatment Plants

*It is recommended that the Florida Legislature establish programs that will encourage and provide incentives for the deployment of technology to allow for the capture or combustion of fugitive methane from landfills and wastewater treatment plants, in order to keep methane from entering the atmosphere. These programs should encourage the creation of multi-county regional solutions to accomplish this goal. Counties should seriously investigate their participation in methane capture programs.*

### Capturing Methane Reduces

### Greenhouse Gas Emissions

Landfills are the largest anthropogenic source of methane emissions in the United States. Landfill gas, primarily methane (CH<sub>4</sub>) and carbon dioxide (CO<sub>2</sub>), is produced as a result of the normal decomposition of organic waste in an anaerobic (without oxygen) environment. Most landfill gas is emitted directly to the atmosphere. However, at some landfills the gas is recovered and either burned off (flared) or used as an energy source.

The same anaerobic decomposition process occurs at wastewater treatment plants. Many US states and Florida counties are already capturing and transmitting

methane from landfills and wastewater treatment plants. The Florida Department of Environmental Protection has already prepared a landfill methane inventory.

This type of mitigation project can be expensive. In Jacksonville, JEA spent \$10 million to capture methane from one of its facilities. However, methane capture qualifies for carbon credits in some carbon exchange markets, such as the Chicago Climate Exchange, which can offset some of the costs of methane mitigation.



# 10 Reduce

## Methane Leaks from Oil and Gas Facilities

*It is recommended that the Florida Legislature adopt a program that will offer incentives for technology or equipment upgrades, such as low-emission regulator valves, to reduce or eliminate equipment venting or fugitive emissions of methane from Florida's oil or gas facilities.*

### Reducing Methane Leaks Can \_\_\_\_\_ \_\_\_\_\_ Provide Economic Benefits

Natural gas consists primarily of methane, a potent greenhouse gas, so any leaks during production, processing or transportation should be addressed. There can be an economical benefit from preventing the waste of methane. Advanced technologies, best management practices and simple leakage reduction opportunities could stop much of the leakage if the incentives encouraged such efforts.

The Federal Energy Regulatory Commission, or FERC, is an independent agency that regulates the interstate transmission of electricity, natural gas, and oil. Because FERC also reviews proposals to build liquefied natural gas terminals and interstate natural gas pipelines, it has excellent documentation of the economic significance of methane leaks.





# **Increasing Florida's Energy Efficiency and Conservation Efforts**



# Introduction

Improving the energy efficiency of Florida's homes, businesses, schools, governments, and industries is one of the most cost-effective ways to address the state's energy-related challenges. Increased investment in energy efficiency in our homes, buildings, and industries can lower energy bills, reduce demand for fossil fuels, help stabilize energy prices, enhance electric and natural gas system reliability, and help reduce greenhouse gases.

**"The cheapest kilowatt is the one we don't use."**

Florida has long recognized the importance of energy efficiency and conservation programs. Since the enactment of the Florida Energy Efficiency and Conservation Act (FEECA) in 1980, utility-sponsored demand-side management (DSM) programs have resulted in significant reductions in customer demand and energy requirements. Through this initiative specific conservation programs such as ceiling insulation upgrades, residential-energy management, and window-film and duct-leak testing are offered, with the utility paying a financial incentive to the customer for installing qualified energy-efficient measures. Utilities also offer cash incentive programs to encourage purchasing energy-efficient equipment for new installations or retrofits, such as heating, air cooling, water heating, and lighting equipment. Load-management is an important part of utility energy conservation plans. Participants are paid to allow the utility to control when certain electric appliances are available for use. The few hours the appliances are unavailable usually occur during peak hours. However, these few hours equal savings for the utilities by helping them avoid constructing high-cost peaking generation.

Since the enactment of FEECA, the PSC estimates that utility-sponsored DSM programs have reduced statewide summer peak demand by an estimated 4,983 megawatts and winter peak demand by 5,577 megawatts. Annual energy savings from utility-sponsored DSM programs were estimated to be 5,896 gigawatt-hours (GWh) in 2006. The demand savings from these programs has deferred the need for ten typical 500 megawatts electric generating plants, or enough energy to serve about 1.6 million households.

The state also has achieved significant energy savings through other programs. For example, the Florida Energy Efficiency Code for Building Construction ("Energy Code") is generally recognized as one of the most effective energy-efficiency codes in the nation. Since its inception in 1979, the code has increased the energy efficiency of residential buildings by about 60 percent and cumulatively saved Floridians more than 34 billion kilowatt-hours of electricity – enough to power more than 3 million new Florida homes for a year. The cost savings also have been significant, estimated at almost \$3.9 billion, cumulatively. Compared to the 1979 Code, the 150,000 homes built in Florida under the current 2007 Code will produce annual cost savings of more than \$190 million per year.

However, much more can and should be done to increase energy efficiency and conservation in Florida. For example, a 2007 report by the American Council for an Energy-Efficient Economy (ACEEE) concluded that an aggressive portfolio of energy efficiency programs, combined with expanded development of the state's renewable energy resources, could meet nearly 30 percent of the state's projected needs for electricity in 2023. Energy efficiency would account for approximately two-thirds of the electricity reductions. The report found that the economic savings associated with the recommended policies could reduce consumers' electric bills by approximately \$840 million by 2013 and \$28 billion by 2023. Similarly, these efforts could reduce the state's emissions by 54 metric tons of carbon dioxide in 2023 – almost 30 percent of the state's projected emissions.

In this report, we present a series of recommendations for further increasing the efficiency of electricity and natural gas, and reducing peak power demand. These recommendations focus on the following four areas:

- Building energy efficiency
- Utility demand-side management
- Public-sector policies ("Lead by Example" initiatives)
- Consumer incentives and assistance programs

Six of the recommendations address complementary long- and short-term Energy Code enhancements. They

advise gradual increases in energy performance requirements beginning with the 2007 Energy Code, and establish incremental increases in code stringency. They also establish stronger appliance and lighting energy-efficiency standards, and modernize Florida's approaches to energy-efficiency rating, making them more appropriate for today's market. Finally, they suggest integrating renewable energy systems into the Building Code, and upgrading building- and appliance-labeling requirements to ensure consumers understand the potential for energy and cost savings.

In addition to the specific recommendations detailed below, there are a number of important, long-term strategies that Florida should address. First, the state should recognize energy efficiency as a high-priority energy resource. Experiences in other jurisdictions indicate that these programs are most effective when established and maintained over the long-term. Second, in order for energy efficiency policies to be successful Florida's energy stakeholders must effectively communicate the benefits and opportunities to consumers. Education and consumer awareness are essential elements in the success of these programs. Third, energy efficiency programs require consistent and long-term funding to effectively compete with energy supply options. Florida should evaluate options to create a dedicated funding source to support energy efficiency programs. Finally, state policymakers should enact policies that align utility incentives with the delivery of cost-effective energy efficiency and modify ratemaking practices to promote energy-efficiency investments.



*It is recommended that the Florida Legislature direct the Florida Building Commission to implement the following goals through the triennial code adoption process:*

- *Include the necessary provisions in the 2010 edition of Florida Energy Efficiency Code for Building Construction (“Energy Code”) to increase the energy performance of new buildings by at least 20 percent from the 2007 Energy Code;*
- *Increase the energy efficiency requirements of the 2013 edition of the Energy Code by at least 30 percent as compared to the 2007 Energy Code;*
- *Increase the energy efficiency requirements of the 2016 edition of the Energy Code by at least 40 percent as compared to the 2007 Energy Code; and*
- *Increase the energy efficiency requirements of the 2019 edition of the Energy Code by at least 50 percent as compared to the 2007 Energy Code.*

*It is further recommended that the Legislature direct the Florida Building Commission to identify within code support/compliance documentation and computer programs the specific building options and elements available to meet the enhanced energy efficiency goals identified above. Examples of potential building options/elements include:*

- *solar hot water heating,*
- *energy efficient appliances,*
- *energy efficient windows, doors and skylights,*
- *low solar absorption roofs (“cool roofs”),*
- *enhanced ceiling and wall insulation,*
- *reduced leak duct systems,*
- *programmable thermostats, and*
- *energy efficient lighting systems.*

*Continued on next page*

*Finally, it is recommended that the Legislature direct the Florida Energy Commission to periodically review the energy efficiency goals established above. This review must be performed at least once every three years and must be completed prior to the triennial code adoption process.*

## More Home Appliances in the Building Code Saves Energy

The Florida Energy Efficiency Code for Building Construction is a mature (established in 1979) building code with which designers, builders and code enforcement officials are familiar. The current Energy Code establishes standards for three key energy uses: cooling, heating, and hot water. Its efficiency standards track national engineering standards and model energy code as those standards advance over time, and incorporate additional Florida-specific provisions that have resulted in requirements more stringent than those in the national code. Florida's proposed 2007 Code likely will result in new homes that are about 4 percent more efficient than homes built to the standards of the 2006 International Energy Conservation Code.

Since its inception, the Energy Code has resulted in a 60 percent increase in residential efficiency. The result is that a 2007 house uses one third the amount of energy for space cooling and one quarter the amount of energy for space heating as a 1979 house of equal size. However, as home heating and cooling systems became more efficient, energy use due to "other" building com-

ponents (appliances, lighting, etc.) has increased from 29 percent of total home energy use in 1979 to 53 percent today. Energy use for water heating essentially has remained unchanged.

Historically, the Energy Code has addressed only space-conditioning and water-heating use for residential buildings, leaving what now is the largest segment of residential energy use untouched. Including this segment in the Energy Code makes it possible to increase overall building efficiency to a level beyond today's requirements. In coming years, that possibility will become more achievable because of new and emerging technologies and updated federal regulations for minimum heating, cooling and appliance efficiency levels.

# 12 Enhance

## The 2007 Energy Code

*It is recommended that the Florida Building Commission amend the 2007 Florida Energy Efficiency Code for Building Construction to significantly increase the energy performance of new buildings. Recommendations for necessary statutory revisions should be submitted to the Legislature by March 1, 2008.*

## Increased Energy Efficiency in Buildings Saves Energy and Money

Florida law requires Energy Code components to be cost-effective to consumers. The cost/benefit study on residential buildings conducted in the 1980s, when the last major step in residential building efficiency requirements took place, has not been reevaluated since. The 2007 Legislature provided funding and direction for a new study to form the basis for setting new performance requirements. That economic analysis is underway. Options are available for near-term enhancement. Assuming energy cost increases and technology advancements align, the cost of higher performance standards will be justified.

In response to the Governor's Executive Order 07-127 (promulgated in July 2007), the Florida Building Commission has initiated efforts to revise the Building Code to increase efficiency by 15 percent. The target date for revising the energy code is January 1, 2009.

Necessary statutory changes should be submitted to the Legislature for consideration during the 2008 Session.

# 13 Increase

## Appliance and Lighting Energy Efficiency Standards

*It is recommended that the Florida Building Commission increase the stringency of Florida's residential appliance efficiency and lighting standards. The Florida Building Commission should submit its recommendations for necessary statutory changes to the Legislature by March 1, 2008.*

### Appliance Efficiency Standards

### Reduce Energy Use and Costs

Appliance efficiency standards have been an effective tool for improving energy efficiency. At the federal level, the U.S. Department of Energy (DOE) has been responsible for setting minimum appliance standards and test procedures for an array of residential and commercial appliances and equipment since 1987. As of 2000, federal appliance efficiency standards had reduced U.S. electricity use by 2.5 percent and carbon emissions by nearly 2 percent. By 2020, the benefits from existing standards are expected to more than triple as the stock of appliances and equipment is replaced by more efficient models. The appliance standards for 16 additional products included in the Energy Policy Act of 2005 (EPAAct 2005) are expected to yield an additional 2 percent savings in total electricity use.

State appliance efficiency standards establish minimum energy efficiency levels for appliances and other energy-consuming products. These standards typically prohibit selling less efficient models within a state. Many states

are implementing appliance and equipment efficiency standards, where cost-effective, for products that are not already covered by the federal government. Presently, 12 states have adopted state appliance efficiency standards. Florida's existing appliance efficiency law only extends to three categories of appliances (refrigerators/freezers, lighting equipment, and showerheads).

In response to the Governor's Executive Order No. 07-127 (promulgated in July of 2007) the Building Commission has initiated rulemaking to enhance appliance-efficiency standards. The executive order specifies a 15 percent increase over current standards. The target date for revising the appliance efficiency rules is July 1, 2009.

Necessary statutory changes should be submitted to the Legislature for consideration during the 2008 Session.

# 14 Integrate

## Building Energy Efficiency Programs

*It is recommended that the Legislature direct the Florida Building Commission to evaluate how the Florida Energy Efficiency Code for Building Construction could be restructured to effect additional improvements to building efficiency in the future. Findings and recommendations should be made to the 2009 Legislature.*

### Restructuring the Florida Energy Efficiency Code will Result in Future Energy Savings

Since the creation of the Energy Code in 1979, Florida also has established laws regulating appliance efficiencies and building energy-efficiency ratings. Originally separate policies were established to influence energy efficiency in buildings from different approaches. But the markets and regulatory environment have evolved to offer significant new opportunities for integrating these three approaches together into a potentially more effective whole.

The Energy Code and the building energy rating system use very similar computer programs, so trained private-sector service providers already exist. Where the current Energy Code is limited to space heating and cooling and water heating, the building energy rating system includes additional building components which could be influenced through building code minimum-performance requirements.

The building-code enforcement options also have evolved significantly. The law now allows Building

Code plan reviews and inspections to be conducted by “private providers.” The building energy rating program certifies raters who evaluate building plans and conduct inspections, and could qualify private providers for energy code enforcement. This potential goes beyond code enforcement. Realizing the building component of energy efficiency especially depends on construction quality. Code enforcement jurisdictions do not evaluate construction quality. They only enforce minimum requirements established by the codes. Private inspectors can provide both quality assurance and minimum-code enforcement.

The energy code can include appliance and building component efficiencies that may be preempted by federal standards if adopted under authority of the Florida appliance efficiency law. The building code applies only to new construction, so its standards affect the market but do not establish absolute minimum requirements for all models of a product.



# 15 Strengthen

## Energy Efficiency Labeling for Buildings and Appliances

*It is recommended that the Legislature strengthen policies set forth in the Thermal Efficiency Code (s. 553.900 F.S.), the Energy Conservation Standards Act (s. 553.951 F.S.) and the Florida Building Energy Efficiency Ratings Act (s. 553.990 F.S.) requiring labeling of new buildings and energy consuming products for energy efficiency.*

### Improved Labeling Requirements Can Increase Energy Saving Consumer Choices

In order to effect energy conservation in the buildings sector minimum efficiency regulations must be coupled with robust market forces. Florida currently has three laws that address minimum efficiency requirements and energy-efficiency market enhancement. These three labeling programs can be strengthened to motivate consumers to adopt energy conservation measures.

The efficiency of building elements is addressed by the Thermal Efficiency Code. The efficiency of other ener-

gy-using elements in buildings is addressed by the appliance standards authorized by the Energy Conservation Standards Act. The Building Energy Efficiency Ratings law requires a uniform system of providing building-efficiency information to buyers. Each of these laws incorporates the concept of building and product labeling which is fundamental to consumers' ability to make conservation choices based on product performance. Adding label emphasis and improving coordination of label requirements could enhance the effectiveness of this market support policy.



# 16 Integrate

## Renewable Energy Systems into the Florida Building Code

*It is recommended that the Florida Legislature amend the “Florida Building Codes Act” and the “Florida Thermal Efficiency Code” statute to require that the Florida Building Code and Florida Energy Efficiency Code for Building Construction facilitate and promote the use of cost-effective energy conserving, energy demand management and renewable energy technologies in buildings.*

### Building Code Inclusion Moves Technology Into the Market More Rapidly

Renewable energy and energy demand management technologies offer a strong potential to reduce energy consumption in the building sector, and to improve energy utility efficiencies. A regulatory environment conducive to market innovation is essential to realizing the benefits of this potential.

Building codes address existing technologies with well-established health and safety standards, and rely on code-enforcement jurisdiction personnel’s judgment to allow new technologies to be integrated into buildings before the extended process of product maturation has run its course. However, most jurisdictions are re-

luctant to allow using innovative technologies on their own, and prefer to rely on the recognition of codes-and-standards writing bodies.

Reducing regulatory barriers and providing an incentive to integrate energy management and conservation technologies into building construction requires establishing policies that prioritize administrative agencies’ direction of attention and resources to that goal. By directing the Florida Building Commission to specifically address including such products into the Building Code the state can expedite their use in the market.

# 17 Encourage

## "Cool Roofs" and "Green Roofs"

*It is recommended that the Florida Legislature direct the appropriate agency or entity to establish design and engineering specifications for energy-efficient roofs for homes and commercial building, that Florida building codes encourage the use of energy efficient roofs, and that the Florida Legislature prohibit any state or local zoning or building authority, or homeowners', cooperative or condominium association from preventing or restricting the use of these energy-efficient roof designs including white roofs, photovoltaic solar panels, solar hot water systems, rooftop gardens, rooftop, or shade trees that shelter roofs, with exception made for public safety concerns.*

## Cool and Green Roofs Improve

### Energy Costs and Building Comfort

Traditional roofs usually are dark and, therefore, absorb more heat. They can reach temperatures of 150 to 190 degrees Fahrenheit. This contributes to increased energy use by air conditioners, higher utility bills, higher peak electricity demand, raised electricity production costs, grid overburdening, increased air pollution due to the "heat island" effects, accelerated roofing-material deterioration, increased roof-maintenance costs, and higher amounts of roofing waste sent to landfills.

Cool roofs reduce the roof surface temperature by up to 100 degrees Fahrenheit, and reduce the heat transferred into the building below. This reduces energy costs, improves occupant comfort, cuts maintenance costs, increases the life cycle of the roof, and reduces urban heat islands along with associated smog.

Initial material costs of "cool roofs" are comparable with traditional roofing materials - some cool products cost less than traditional materials, some cost up to 20 percent more. Cool protective coatings can be reapplied repeatedly every 10 to 15 years and reduce, if not eliminate, the need for expensive roof tear-offs. Combining these maintenance savings with an average 20 percent savings on air conditioning costs make cool roofing extremely cost-effective.

# 18 Facilitate

## Compact Fluorescent Light Bulb Disposal/Recycling Program

*It is recommended that the Legislature direct the Department of Environmental Protection to develop a state-wide compact fluorescent light bulb disposal or recycling program.*

### Compact Fluorescent Bulbs Last Longer and Reduce Energy Costs

According to the U.S. Department of Energy, if every American home replaced just one incandescent light bulb with a compact fluorescent light bulb (CFL), the resulting savings could light more than 3 million homes for a year (equaling more than \$600 million in annual energy costs) and prevent greenhouse gases equivalent to the emissions of more than 800,000 cars.

CFLs contain a very small amount – an average of 5 milligrams – of mercury sealed within the glass tubing – about the amount that would cover the tip of a ballpoint pen. By comparison, older thermometers con-

tain about 500 milligrams of mercury. Mercury currently is an essential component of CFLs, and is what allows the bulb to be an efficient light source. No mercury is released when the bulbs are intact or in use.

The small amount of Mercury is a deterrent in the minds of some consumers to the use of CFLs. A number of parties have suggested that DEP can help overcome this perceived barrier to the use of CFLs by facilitating programs for disposing of or recycling CFLs.

## 19

## Require

## Use of Compact Fluorescent Light Bulbs in New Homes and Businesses

*It is recommended that the Florida Legislature require, in a new house or business building on which construction is started on or after June 2009, the use of compact fluorescent light (CFL) bulbs in all appropriate light fixtures instead of using incandescent light bulbs.*

## Compact Fluorescent Bulbs

## Provide a Return on Investment

Research indicates that incandescent bulbs are one of the least efficient ways to light a home. Economical alternatives are readily available. CFL bulbs can last up to 13 times longer than incandescent bulbs, allowing a much longer time in between replacement. Though CFL's cost more to buy than incandescent bulbs, a CFL can save 8 to 12 times its cost during its life cycle and up to 2000 times its own weight in greenhouse gas emissions.

CFLs lighten the load for other appliances. Less than 10 percent of energy consumed by incandescent bulbs is used to create light – the rest, more than 90 percent, is wasted as heat. This makes the bulb hot to the touch and requires cooling systems to work harder.

There is some concern over the danger posed to public

health and the environment by the 5 mg of mercury in each CFB – a small, but significant amount. Some states – New Hampshire, in particular – have addressed this by requiring retailers to accept used CFLs for proper disposal and by circulating public education materials on proper cleanup procedures in the event of a mercury spill. North Carolina's CFL initiative includes public education and information, workshops and events, including free bulb giveaways, and a partnership with Progress Energy, a utility company, to provide a \$1 discount on fluorescent bulbs at certain retail stores until the end of 2007 or until 200,000 bulbs have been sold.

# 20 Assess

## An Energy Efficiency Resource Standard

*It is recommended that the Legislature direct the Florida Energy Commission and Public Service Commission to review the potential benefits and costs associated with the creation of an Energy Efficiency Resource Standard (EERS). The Florida Energy Commission should report its findings and recommendations to the Legislature by December 31, 2008.*

## The Benefits of an EERS are Valuable to Floridians

An EERS (sometimes referred to as an “Energy Efficiency Portfolio Standard”) requires energy providers to meet quantitative targets (generally stated as a percentage of future load growth) for energy savings, typically in the electricity and natural gas sectors. This kind of policy instrument is similar to, and may be linked to, a renewable portfolio standard that requires utilities to generate a set portion of electricity from renewable energy resources. State public utility commissions or other regulatory bodies specify explicit numerical goals that regulated utilities and other entities engaged in energy efficiency program delivery are expected to meet on an annual and cumulative basis. An EERS may specify that implementation will involve coordination with a public benefit fund.

Presently, 14 states have energy efficiency standards or goals. Six states include energy efficiency in a renewable portfolio standard or goal. Overall, these EERS targets range from the equivalent of a 10 percent to 50 percent reduction in projected energy demand growth. Specific EERS designs vary by state. Some states, such as California, have established specific energy savings goals defined in terms of the amount of savings (e.g., expressed as MW, megawatt-hours [MWh], and/or therm savings) required over a specified time frame. Other states (e.g., Connecticut, Texas, and Illinois) require utilities to use energy efficiency to meet a specified percentage of total energy sales, or to forecast load growth over a certain time period.



## 21

## Review

## Cost-Benefit Tests for Demand-Side Management Programs

*It is recommended that the Legislature direct the Florida Energy Commission and the Public Service Commission to evaluate the current cost-effectiveness standard (the Rate Impact Measure Test) used to assess demand side management program and in doing so look at other tests that recognize the interactive effect of reduced energy demand from efficiency and conservation programs. The Florida Energy Commission should report its findings and recommendations to the Legislature by December 31, 2008.*

## Assessing Energy Efficiency Programs

Regulators in other states use a variety of cost-effectiveness tests in assessing proposed demand-side management programs. This helps ensure the effective use of public funds and can be used to compare program and technology performance with the aim of developing effective future programs. Cost-effectiveness tests states commonly use include:

**Participant Test** -The Participant Test measures the quantifiable benefits and costs to the customer due to program participation. The benefits include: reduction in utility bills, incentives, federal, state, or local tax credits, and increased productivity and/or service. The primary costs include: equipment, installation, sales tax, ongoing operation and maintenance, and removal.

**Program Administrator Cost (PAC) Test** -The Program Administrator Cost Test measures the net costs of a demand-side management program as a resource option based on the costs incurred by the program administrator, including incentive costs and excluding any net costs incurred by the participant. The benefits are the savings from the avoided supply costs and include: generation cost savings (energy and capacity), transmission cost savings, and distribution cost savings. The only costs that are included are the administrative program costs and incentives paid to the participants.

**Rate Impact Measure (RIM) Test** - The Rate Impact Measure Test measures what happens to customer bills

## With the Best Test is Critical

or rates due to changes in utility revenues and operating costs caused by the program. The benefits are the savings from the avoided supply costs and include: generation cost savings (energy and capacity), transmission cost savings, and distribution cost savings. The costs include: administrative program costs, incentives paid to the participants, and decreased revenues.

**Total Resource Cost (TRC) Test** - The Total Resource Cost Test measures the net costs of a demand-side management program as a resource option based on the total costs of the program, including both the participants' and the utility's costs. Since the revenue (bill) change and the incentive terms tend to cancel each other, the benefits include: federal, state, or local tax credits, increased productivity and/or service, generation (energy) cost savings, energy cost savings, transmission cost savings, and distribution cost savings. The costs include: administrative costs for incentive program, equipment, installation, sales tax, ongoing operation and maintenance, and removal. The TRC test is generally regarded as the most widely used cost-benefit test.

Review of national trends suggests that states are moving away from the single test model in general, and the RIM Test in particular. The primary criticism of the RIM Test is that it does not account for the interactive effect of reduced energy demand from efficiency investments on longer term rates and customer bills. Under the RIM test, any program that increases rates would not pass, even if total bills to customers are reduced.



# 22 Establish

## Advanced Metering Systems and Pricing Strategies

*It is recommended that the Legislature direct the Public Service Commission to develop regulatory policies that encourage the deployment of advanced metering systems and innovative pricing strategies.*

### Smart Metering Helps Energy Consumers Save on Costs

New programs around the nation are demonstrating that advanced metering systems (“smart meters”) can help both consumers and utilities. While time-of-use or interval meters have been used for a number of years, a new emerging class of electric and gas meters incorporate a mix of interactive technologies.

Together with pricing structures that reflect the cost differences of generating electricity at different times, smart meters enable customers to adjust their energy consumption patterns to save money. In addition to costs savings for consumers, these systems offer significant operational cost savings and related benefits for utilities, including: meter-reading automation; outage detection; remote connection/ disconnection; reduced energy theft; improved outage restoration; improved load research; reduced demand during times of system

stress; decreased transmission and distribution system congestion; and reduced reliance on inefficient peaking generators.

Pricing strategies can take many forms including: (a) real-time pricing in which utility customer rates are not fixed, but reflect the varying costs that utilities themselves pay for power (which vary substantially during the day and over the seasons); (b) “time-of-use” rates which are fixed rates for different times of the day and/or for different seasons; (c) “increasing block” rates that rise as consumption increases; and (d) green pricing whereby customers are given the opportunity to purchase electricity with a renewable or cleaner mix than the standard supply mix offered by the utility.

# 23 Require

## Annual Report by FEECA-Exempt Utilities

*It is recommended that the Legislature require utilities that are exempt from the Florida Energy Efficiency and Conservation Act, but are subject to the Ten-Year Site Plan requirement, to submit an annual report to the Public Service Commission identifying energy efficiency and conservation goals and the actions taken to meet those goals.*

## More Utilities Reporting Conservation Efforts Increases Accountability

The Florida Energy Efficiency and Conservation Act (FEECA) was enacted in 1980 and was intended to reduce the peak-demand growth rates, and reduce and control electricity consumption growth rates. Under FEECA, the PSC was required to adopt conservation goals for applicable utilities. Similarly, the PSC was authorized to require utilities to develop plans and implement cost-effective programs for increasing energy efficiency and conservation within their respective service areas. Utilities are entitled to recover associated program costs.

FEECA was amended in 1989 to increase the threshold for subject utilities (greater than 500 gigawatt hours in annual sales). This revision reduced the number of subject utilities to 12, representing 94% of electricity sales. In 1996 FEECA was subsequently amended to increase the threshold to annual sales of 2,000 gigawatt hours or greater. Currently, the following utilities (representing roughly 86 percent of sales and 82 percent of customers) are subject to FEECA:

- Florida Power and Light
- Progress Energy Florida
- Tampa Electric Company
- Gulf Power
- Florida Public Utilities Company
- Jacksonville Energy Authority
- Orlando Utility Commission

A number of entities have argued that, due to Florida's forecasted growth in energy use, and the need to improve overall state energy conservation and efficiency efforts, all utilities, regardless of size, should be held to the same or similar standard. Smaller municipal utilities and electrical cooperatives oppose eliminating the FEECA exemption citing the disproportionate burden it would impose on small utilities.

# 24 Establish

## Energy Efficiency Requirements for State Buildings

*It is recommended that the Florida Legislature require that all state government buildings be constructed in accordance with the United States Green Building Council's Leadership in Energy and Environmental Design (LEED) program, the Green Building Initiative's Green Globes program, the Florida Green Building Coalition's standards, or any other nationally-recognized, green building system that is approved by the Department of Management Services.*

### Using "Green Building" Systems will

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### Reduce the State's Energy Costs

The Leadership in Energy and Environmental Design (LEED) program was developed by the United States Green Building Council (USGBC). The LEED program is intended to reduce energy consumption, reduce energy costs, provide for sustainable development, create water savings, and improve indoor environment quality. The LEED program uses a Green Building Rating system to evaluate buildings for their consideration of these factors, and then scores them to determine if they meet or exceed LEED conservation goals. Buildings that meet the minimum LEED standards are placed in one of four categories: "certified," "silver," "gold," and "platinum," with "platinum" being the highest building standard and "certified" being the lowest.

A number of other programs to promote creating green buildings also have been developed. These programs include the Florida Green Building Coalition and the Green Building Initiative's Green Globes program. Similar to the LEED program, the Florida Green Building Coalition, and the Green Globes programs use a checklist to rate buildings on their efficiency levels. Also, much like the LEED program, the Florida Green

Building Coalition evaluates buildings in a variety of "resource efficiency" categories, including energy, water, lot choice/site, health, materials, disaster mitigation, and other general measures.

HB 7123 (2007 Legislative Session) included a provision requiring that all new buildings constructed and financed by the state must be designed to certain energy efficiency and sustainability standards. HB 7123 ultimately was vetoed by the Governor.

The Governor's Executive Order 07-126 directs the Department of Management Services to adopt the USGBC's Leadership in Energy and Environmental Design for New Construction (LEED-NC) standards for all new buildings. The Department is directed to strive for Platinum Level certification, the highest possible certification, for any new building constructed for or by the State of Florida.

# 25 Establish

## "Green Schools" Initiative

*It is recommended that the Florida Legislature direct the Department of Education in conjunction with the appropriate local school authorities and the State University System to develop a "Green Schools" initiative that incorporates energy and resource efficient designs into new educational buildings. Such buildings should be built in compliance with the Leadership in Energy and Environmental Design (LEED) Rating System, the Green Building Initiative's Green Globes System, the Florida Green Building Coalition standards, or any other appropriate nationally recognized and verifiable standard.*

## "Green Schools" Save Energy by \_\_\_\_\_ \_\_\_\_\_ Using an Integrated-Design Strategy

A number of jurisdictions are focusing on opportunities to design and build new educational facilities that improve the learning environment while saving energy, resources, and money. High performance or "green" schools achieve these goals by using a whole-building, integrated-design strategy that incorporates the best of today's ideas and technologies. From the beginning of the design process, each building element (windows, walls, building materials, air-conditioning, landscaping, etc.) is considered part of an integrated system of interacting components. Choices in one area often affect other building systems; integrated design leverages these interactions to maximize the building's overall performance.

Proponents maintain that the benefits of green or high-performance schools include higher test scores, increased average daily attendance, lower operational

costs, improved teacher satisfaction and retention, decreased liability, and reduced environmental impacts.

In 2007, the U.S. Green Building Council is scheduled to release their LEED for Schools program. To qualify for the LEED for Schools designation, individual buildings must meet specifications for land use, water and energy efficiency, construction materials, and indoor air quality. LEED serves as a design guideline for green buildings and offers third-party validation of a building's green features.

The 2007 Florida Legislature supported adopting LEED standards for constructing new state-owned buildings, renovating existing state-owned buildings, and enhancing state-building energy efficiency.

# 26 Utilize

## Guaranteed Energy Performance Savings Contracts

*It is recommended that the Florida Legislature amend the statutory provisions relating to the use of Guaranteed Energy Performance Savings Contracts to encourage state agencies to invest in energy conservation measures to reduce energy consumption and maximize energy-related savings.*

### Guaranteed Energy Performance Contracts Increase Energy Savings

Under the Guaranteed Energy Performance Savings Contract Act (GEPSCA), the state and other public entities may contract with an Energy Service Company for energy conservation measures. These energy conservation measures must produce a utility savings sufficient to cover the cost of financing, completing, and maintaining the contract. To accomplish this, the contractor guarantees that the public entity will achieve a utility savings sufficient to finance the proposed energy conservation measures. If the utility savings are not sufficient to cover each individual financing payment, the contractor must pay for the shortfall. Before a state agency may enter into a contract, it generally submits the project to the Department of Management Services for technical review, and the Chief Financial Officer for financing approval.

While a number of other public entities, including local governments, have entered into these types of contracts, relatively few state agencies have elected to utilize this

financing option. One reason appears to be continuing concerns relating to the financing terms and the substance of the contracts. Another concern relates to the fact that state agencies rarely use the state's line of credit under the state's Deferred Payment Commodity Contracts and Consolidated Financing of Deferred-Payment Purchases programs because these programs only allow for ten years of project financing instead of the twenty years authorized for GEPSCA contracts.

HB 7123 (2007 Legislative Session) included a provision requiring that agencies identify state-owned buildings suitable for GEPSCA. The bill also addressed a number of contracted concerns relative to GEPSCA that had been raised by the Chief Financial Officer. HB 7123 ultimately was vetoed by the Governor.



## 27 Revitalize Florida's Recycling Efforts

*It is recommended that the Legislature adopt a long term goal for the reduction of solid waste by recycling efforts undertaken by state government. The goal shall be a reduction by 2020 of 75 percent of the solid waste that was disposed of by state government in 2007, not including any recycling efforts undertaken during that year. The Department of Environmental Protection (DEP) shall by 2010 develop a recycling program, in conjunction with the state judicial and legislative branches of government, designed to meet that goal.*

*It is also recommended that the Legislature adopt a long term goal for the reduction of municipal and county solid waste by recycling efforts undertaken by such local government. The goal shall be a reduction by 2020 of 75 percent of the amount of the solid waste that was disposed of in 2007, not including any recycling efforts undertaken. Each county shall provide to the DEP by 2010 a recycling program for that county, including municipalities, designed to meet that goal.*

*It is also recommended that the Legislature adopt a recycling grant program to aid local communities in establishing, operating, or providing public awareness for such recycling efforts. Counties and municipalities are encouraged to form inter-local agreements to pursue such recycling programs when applying for grants. The following factors shall be considered, among others, when selecting recipients for the recycling program grants:*

1. *The benefits to energy conservation and the environment,*
2. *The availability of capacity at existing solid waste facilities, and*
3. *The level of commitment of local officials, and the level of volunteer and private sector interest in the program.*

*To be eligible to receive a grant, local communities must commit to a 50 percent local match to the amount awarded by the State. Also, the local recycling project must be planned or underway and the education project must directly promote the use of that project.*

## Recycling Lowers Carbon

### Emissions and Saves Land

Before the 1920s, 70 percent of U.S. cities ran programs to recycle certain materials. After World War II the rate fell. Because of concern, in part, for the environment recycling is again on the upswing. The nation's current rate for composting and recycling is approximately 33 percent. Florida's statewide recycling rate in 2000 was 28 percent.

Recycling is one of the most frequently identified options available to address climate change. Recycling

helps to significantly lower carbon emissions associated with extracting virgin materials, manufacturing products and waste disposal. Last year on a national level the amount of energy saved from recycling aluminum and steel cans, plastic products, glass containers, newsprint, and corrugated packaging was equivalent to:

- The amount of electricity consumed by 17.8 million Americans in one year.



- 29 percent of nuclear electricity generation in the U.S. in one year.
- 7.9 percent of electricity generation from fossil fuels in the U.S. in one year.
- 11 percent of the energy produced by coal-fired power plants in the U.S.
- The energy supplied from 2.7 percent of imported barrels of crude oil into the U.S.
- The amount of gasoline used in almost 11 million passenger automobiles in one year.

In Florida, by recycling one ton of paper we save approximately 17 trees, 6,953 gallons of water, 463 gallons of oil, 3.06 cubic yards of land fill space, and 4,077 kilowatt hours of energy.

There are several state programs to encourage recycling. For example, the Innovative Recycling Grant Program administered by the DEP is aimed at funding technologies or processes that represent a novel application of an existing technology or process, or that overcome obstacles to recycling/waste reduction in new or innovative ways. On a more comprehensive basis, the 1988 Solid Waste Management Act revised nearly all aspects of the state's solid waste management programs. It required each county to initiate a recycling program with the goal of achieving a 30 percent municipal solid waste recycling rate by the end of 1994. Funding for both of these programs has been inconsistent.

# 28 Encourage

## State Procurement of Alternative Fuel Motor Vehicles

*It is recommended that the Florida Legislature direct the Department of Management Services to implement the following:*

- *Conduct an inventory to determine the percentage of motor vehicles purchased or leased with state funds that are alternative fueled or hybrid motor vehicles; and*
- *Purchase or lease over the next 3 years only those vehicles with the greatest fuel efficiency in a given class.*

*In implementing this provision the Department should exempt special purpose, law enforcement, and heavy duty vehicles.*

## State Fleet Alternative Fuel Vehicles

### Reduce Greenhouse Gas Emissions

As part of “Lead by Example” initiatives, a number of states are adopting policies that require a state or local agency’s fleets to contain a certain percentage of alternative fuel vehicles (AFVs). Recent examples of state-mandated fleet requirements include:

- Connecticut - Signed into law on June 29, 2007, Public Act No. 4 requires 50 percent of new state vehicles to be alternative fueled, hybrid or plug-in electric after 2008. All state vehicles purchased after 2012 must meet this requirement. The law also provides sales tax exemptions for high mileage per-gallon, low-emission vehicles.
- Tennessee - Signed into law on June 27, 2007, SB 123 requires 30 percent of motor vehicles purchased by the state during the fiscal year be energy efficient, i.e., be flex-fuel, alternative fuel, hybrid vehicles or have at least 25 mpg highway rating.
- Texas - Signed into law on June 15, 2007, HB 2293 requires that not less than 10 percent of state agency-purchased vehicles meet or exceed certain emission standards.

The Florida Department of Management Services’ Fleet Management administers acquiring, operating, maintaining, and disposing of the state’s fleet of motor vehicles and watercraft. Florida’s fleet includes about 25,000 units, including automobiles and light, medium and heavy trucks, construction and industrial equipment, tractors and mowers, motorcycles, and small utility and all-terrain vehicles.

The Governor’s Executive Order 07-126, directs the Department of Management Services to, when procuring new vehicles for all state agencies and departments under the Governor’s direction, approve only vehicles with the greatest fuel efficiency in a given class as required for that vehicle to minimize greenhouse gas emissions. The Department is to consider any specific circumstances of law enforcement agencies in processing vehicle purchase and lease agreements.

# 29 Establish

## Energy-Efficient Products Sales Tax Holiday

*It is recommended that the Florida Legislature establish a sales tax rebate program for energy efficient products which would be in effect year round. Additionally, the month of October would be designated “Energy Efficiency and Conservation Month,” with the first full week of October being “Energy Efficiency and Conservation Awareness Week.”*

*Should the year round sales tax rebate program not be approved, it is recommended that the Legislature designate one week in October as “Energy Efficient Products Sales Tax Holiday,” during which sales tax may not be collected on new energy efficient products sold.*

### Sales Tax Holiday Increases

### Energy Efficient Purchases

The benefits of purchasing energy-efficient products are well documented. These products typically use 25 to 50 percent less energy, reduce energy costs without compromising quality or performance, reduce air pollution and carbon emissions by burning fewer fossil fuels, offer significant return on investment, and provide extended product life and decreased maintenance.

Pursuant to SB 888 enacted during the 2006 Legislation Session, the period from 12:01 a.m., October 5 through midnight October 11, 2006, was designated a sales tax holiday for new energy-efficient products sold during that period and having a selling price of \$1,500 or less.

The exemption only applied to items purchased for personal use, and included products such as dishwashers, clothes washers, air conditioners, ceiling fans, incandescent or florescent light bulbs, dehumidifiers, programmable thermostats, or refrigerators that met certain criteria.

HB 7123 (2007 Legislative Session) included a provision reauthorizing the energy-efficient sales tax holiday. HB 7123 ultimately was vetoed by the Governor.

# 30 Institute

## Property Tax Exemption for Renewable Energy Source Devices

*It is recommended that the Florida Legislature reauthorize the property tax exemption for renewable energy source devices and revise the calculation of the property tax assessment for applicable properties.*

### Renewable Energy Improvements

### Should be Penalty-Free

Section 3(d), Article VII, Florida Constitution, provides the following:

By general law and subject to conditions specified therein, there may be granted an ad valorem tax exemption to a renewable energy source device and to real property on which such device is installed and operated, to the value fixed by general law not to exceed the original cost of the device, and for the period of time fixed by general law not to exceed ten years.

In 1980, the Legislature authorized a property tax exemption for real property on which a renewable energy source device is installed and is being operated. However, the exemption expired after 10 years. Specifically, the exemption period authorized in statute was from January 1, 1980 through December 31, 1990. Therefore, if an exemption was granted in December 1990, the exemption terminated in December 2000. The law required that the exemption could be no more than the lesser of the following:

- The assessed value of the property less any other exemptions applicable under the chapter;
- The original cost of the device, including the instal-

lation costs, but excluding the cost of replacing previously existing property removed or improved in the course of the installation; or

- Eight percent of the assessed value of the property immediately following the installation.

The Florida Solar Energy Industries Association reports that the current options are cumbersome and that property owners who are adding solar energy systems are having their property taxes raised for those improvements. The Association noted that because of the expiration of the exemption, homeowners who have installed solar energy systems on their property have the unforeseen dilemma of a property tax liability that diminishes the savings generated by these systems and discourages buyers who are willing to make such an investment in a clean energy future.

HB 7123 (2007 Legislative Session) included a provision reauthorizing the property tax exemption. HB 7123 ultimately was vetoed by the Governor.

# 31 Establish

## Sales Tax Exemption for Low Rolling Resistance Tires

*It is recommended that the Florida Legislature eliminate the sales tax on energy saving, low rolling resistance tires.*

### Eliminating Sales Tax on Low Rolling Resistance Tires Reduces Emissions

Under federal fuel-economy standards, automakers equip new vehicles with tires that have a lower rolling resistance, which leads to higher fuel efficiency. When replacing the original tires, consumers often purchase less efficient tires. Currently, tire manufacturers and retailers are not required to provide information about the fuel efficiency of replacement tires. In addition, there is no current minimum standard for fuel efficiency that all replacement tires must meet.

In 2006, the National Research Council of the National Academy of Sciences conducted a study on the use of low rolling resistance in replacement tires. The study concluded that tires and their rolling resistance characteristics can have a meaningful effect on vehicle fuel economy and consumption. The study found that reducing the average rolling resistance of replacement tires by a magnitude of 10 percent is technically and economically feasible.

A 2003 study commissioned by the California Energy Commission found that about 300 million gallons of gasoline per year can be saved in that state with lower rolling resistance tires. A set of four low rolling resis-

tance tires would cost consumers an estimated \$5 to \$12 more than conventional replacement tires. The efficient tires would reduce gasoline consumption by 1.5 to 4.5 percent, saving the typical driver \$50 to \$150 over the 50,000-mile life of the tires. Consumers would save more than \$470 million annually at current retail prices or approximately \$1.4 billion over the three-year lifetime of a typical set of replacement tires.

In October of 2003, California adopted the world's first fuel-efficient replacement tire law. Specifically, AB 844 requires the Commission to: (1) develop a consumer education program, (2) require that retailers provide labeling information to consumers at the point of sale, and (3) promulgate through a rule development process a minimum standard for the fuel efficiency of replacement tires sold.

To incentivize their use, Florida should create a sales tax exemption for low-rolling resistance tires. Additionally, the state should consider the creation of an efficient tire program similar to those under development in other states.



# 32 Streamline

## The Application Process for Solar Energy Incentives Program

*It is recommended that the Florida Legislature revise the application process for the Solar Energy System Incentives Program to stimulate additional interest in photovoltaic systems.*

### Streamlining the Rebate Application Process

### Boosts Solar Photovoltaic Purchases

In 2006, the Legislature created a solar energy system rebate program to provide financial incentives for the purchase and installation of solar energy systems. Specifically, from July 1, 2006, through June 30, 2010, any state resident who purchases and installs a new solar energy system of 2 kilowatts or larger for a solar photovoltaic system; a solar energy system that provides at least 50 percent of a building's hot water consumption for a solar thermal system; or a solar thermal pool heater is eligible for a rebate on a portion of the purchase price of that system. Applications for rebates must be made within 90 days of the purchase.

The total amount of the rebates is limited each year by the total appropriation for that fiscal year. The 2006 Legislature appropriated \$2.5 million to fund the program. If funds are insufficient in a given year, rebate requests may be processed, and take priority, during the following fiscal year. The program provides the following incentives:

- A rebate of \$4 a watt is provided for the purchase and installation of a solar photovoltaic system of 2 kilowatts or larger on a home or business. The rebate is capped at \$20,000 for a residence and \$100,000 for a place of business, a publicly owned or operated facility, or a facility owned or operated by a private, not-for-profit organization.
- A rebate of \$500 per residence is provided for the purchase and installation of a solar thermal water

heater. Businesses, publicly owned or operated facilities, or facilities owned or operated by private, not-for-profit organizations that have a commercial-sized system are to be paid \$15 per 1000 Btus produced, as verified through an approved metering device. The maximum allowable rebate is \$5,000.

- A rebate of \$100 is provided for the purchase and installation of a solar thermal pool heater.

Since its creation in 2006, the solar energy system rebate program has awarded more than 4,000 rebates. The vast majority of rebates have been for solar thermal water heating and solar thermal pool heating applications. Photovoltaic systems are considerably more costly and complex than solar thermal systems. Prospective purchasers of photovoltaic systems are often reluctant to invest resources into these systems without some certainty that rebate funding is available. To address this concern, a number of states have instituted a rebate reservation system that enables applicants to submit a pre-application that demonstrates the planned system will meet requirements. If the reviewing agency approves the pre-application, it notifies the applicant and reserves the rebate for a specified period of time.

HB 7123 (2007 Legislative Session) included a provision amending the application process to create a rebate reservation system. HB 7123 ultimately was vetoed by the Governor.



# 33 Assist

## Low-Income Energy Consumers

*It is recommended that the Florida Legislature direct the Department of Community Affairs to develop recommendations to increase the availability of assistance through Florida's Low-Income Home Energy Assistance Program and Weatherization Assistance Program.*

## Energy Cost Assistance Helps Low-Income Customers Increase Efficiency

The Low-Income Home Energy Assistance Program (LIHEAP) provides grants to local governments and non-profit agencies to assist eligible low-income households in meeting home heating and cooling costs. The majority of the funds are used for utility payment assistance. There are three categories of assistance available: home energy assistance, crisis assistance, and weather-related or supply-shortage emergency assistance. To be eligible for the program, household income may not exceed 150 percent of the poverty guidelines. The household must provide proof, such as a utility bill, that they are responsible for all or part of the energy costs for the household.

The Weatherization Assistance Program annually provides grant funds to community action agencies, local governments, Indian tribes and non-profit agencies to provide specific program services for low-income families. In order to receive assistance through the program, the total household income may not be more than 50 percent above the national poverty level. Preference is given to owner-occupied homes, elderly or physically disabled residents, families with children under 12, and households with a high energy burden (repeated high utility bills). Types of assistance include repair or replacement of inefficient heating and cooling units, home improvements to minimize air infiltration (weather stripping, caulking, thresholds, etc.), window and door replacement, attic- and floor-insulation installation, and water-heater repair or replacement.

Both programs are managed through the Department of Community Affairs' Division of Housing and Community Development. Funding for these programs is provided entirely by federal agencies. For 2007-2008, funding totaled \$26.5 million for LIHEAP and \$5.3 million (including a \$3.6 million transfer from LIHEAP) for the Weatherization Assistance program. In comparison, 2007 LIHEAP funding for New York totaled \$250 million.

Requests for assistance through LIHEAP and the Weatherization Assistance program have increased significantly in recent years, far outpacing available assistance. Recognizing this concern, the Department of Community Affairs, along with low-income customer representatives, government, social-service agencies and energy providers, have established the Florida Energy Affordability Coalition. The Coalition will recommend policies, procedures and actions that support: customers' health, safety and well-being; maximizing available financial and energy conservation assistance; quality service to customers seeking assistance; educating customers to make informed decisions regarding energy use and conservation; and awareness of customers' other unmet needs.

# 34 Create

## Incentives for Hybrid Trucks

*It is recommended that the Florida Legislature, in order to encourage the expansion of hybrid vehicle technology in the trucking industry, provide incentives for the demonstration and evaluation this technology in medium and large vehicle applications. This incentive program should address the investment cost differential between hybrid and conventional vehicles, be available on a competitive basis for a finite period of time, and be administered, monitored, and evaluated by the Florida Energy Office.*

### Hybrid Technology Boosts

### Utility Trucks' Fuel Efficiency

Hybrid technology is providing significant fuel savings and emissions reductions in passenger cars. At the same time, there are promising hybrid-truck pilot projects underway in the package-delivery truck and utility-truck markets. Initial fuel savings results in hybrid utility trucks range from 40 to 60 percent below that of conventional trucks.

Limited initial purchase incentives are needed to expand the demonstration of this technology into other types of trucks, and to provide enough added manufacturing volume to result in lower purchase costs. The incentive should be structured as a shared investment with the truck purchaser who would pay the cost of an equivalent standard truck plus a reasonable estimate of the hybrid fuel savings. The incentive program would provide the difference between that amount and the

vehicle's total cost.

The incentives should be awarded on a competitive basis. Truck manufacturers anticipate that the added volume of hybrid-truck manufacturing prompted by such demonstration projects will gradually result in lower truck prices. Therefore, the program should be time-constrained (i.e. exist for a maximum period of 5 years).



# **Maximizing Florida's Development of Renewable Energy Resources**

**Florida Energy Commission**

2007 Report to the Legislature



# Introduction

Forming a renewable energy policy is extraordinarily complex. Even well-considered proposals can cause grave harm when they lack crucial information or cause unintended consequences. Therefore, it is imperative to base such an important policy on the best data available and to craft it analytically, with all assumptions stated and methods delineated. Complex problems are not amenable to piecemeal solutions. They should be addressed by identifying all material variables and determining their interrelationships, priorities and implications. These principles guided the development of the renewable recommendations with the understanding that any renewable energy policy must be developed within the context of the larger energy, environment and economic plans of the State.

It should be recognized, however, that there is an inherent paradox in promoting renewable energy in a market-based environment. This paradox arises from the inconsistent policy goals of (1) letting markets make technology choice decisions and (2) intervening in the market to ensure that renewables are chosen more often than they would be if the policy didn't exist. In other words, with respect to energy and environmental policy, renewable generation should be a means to an end and not an end unto itself. There may be additional reasons for promoting renewables, such as economic development, but those reasons must be justified on their merits, and the associated costs should not be unfairly imposed on ratepayers.

The recommendations contained in this report provide a road map for Florida Utilities to use in planning for new generation. It is designed to be an evolving process that accommodates new resources and technologies as they develop. A critical aspect of the approach these recommendations embody is that stakeholders have the opportunity to participate every step of the way. In addition to possessing relevant expertise, the FDEP and the FPSC already provide forums and procedures well-suited for public and industry involvement. To achieve a just result, those who bear the expense and take the risk must have a meaningful voice.

This process fundamentally changes the way Florida historically has approved new generation in the past. In the past, utilities have made proposals to the FPSC

based on their individual requirements. These recommendations acknowledge that there is a larger state purpose to be served, and that new generation proposals should be made with that purpose in mind.

For the reasons stated in the opening paragraph, these renewable energy recommendations rely heavily on the Florida Department of Environmental Protection (FDEP) and the Florida Public Service Commission (FPSC) to provide a factual basis for decision-making that is both current and relevant for Florida. Another major reason why many of the responsibilities in these recommendations involve the FPSC or FDEP is that the Florida Energy Commission (FEC) possesses neither the resources to hold the number of hearings necessary to allow full stakeholder input nor the expertise to conduct the research and technical analysis required to examine critical issues such as generation capacities, availability factors, base load and peaking requirements, transmission implications, economic impacts, or probable costs. These subjects are within the purview of the FPSC or FDEP. These entities are better suited than the FEC to sort through the details and to analyze comparative experiences from other states.





# 35 Set

## A Renewable Energy Policy

*It is recommended that the Florida Legislature develop Florida's renewable energy policy in the context of the larger state energy, environmental and economic plans. In particular, the renewable energy policy should be consistent with the state's greenhouse gas reduction goals, air quality standards, and the guiding principles of reliability, affordability, efficiency and diversity*

## Renewable Energy Policies Should Mesh With Florida's Overall Goals

Renewable energy policies considered by the Florida Legislature should be measured against the goals of the overall energy, environmental and economic policies of the state. The Florida Legislature has provided the Florida Energy Commission with explicit principles that must be addressed in our deliberations: "The recommendations of the commission shall be based on the guiding principles of reliability, efficiency, affordability, and diversity. . . ." §337.901(5), Fla. Stat. Furthermore, the commission is required to make recommendations that minimize untoward effects on the environment and public health: "The generation, transmission, and delivery of electricity should be accomplished with the least detriment to the environment and public health." §337.901(7)(c), Fla. Stat.

Each source of renewable energy must be examined and tested against these guiding principles. The use of any energy source in the production of electricity involves trade-offs. The economic cost of renewable energy is typically higher than that of fossil fuels, but fossil fuels typically have higher CO<sub>2</sub> emissions. Although biofuels generally have better carbon profiles than fossil fuels, the life cycle impact of biofuels must include the emissions associated with fertilizer production and the combustion of fossil fuel consumed in transportation. While lessening our dependence on oil, the popularity of ethanol as a substitute for gasoline has caused the price of corn to increase significantly.

# 36 Define Renewable Energy

*It is recommended that the Florida Legislature adopt the definition of “Renewable Energy” as provided in the “Background Information” section which is to be used for the purpose of creating a renewable portfolio standard.*

## Florida’s Unique Potential for Renewable Energy Requires a Custom Definition

For the reasons following this paragraph, the FEC recommends defining “renewable” as follows: “Renewable Energy” means electrical, mechanical or thermal energy produced from a method that uses one or more of the following fuels or energy sources: hydrogen produced from sources other than fossil fuels or nuclear energy, solar energy, geothermal energy, wind energy, ocean energy, waste heat, hydroelectric power, and biomass. As used in this definition, biomass means a power source that is comprised of combustible residues, oils or gases from forest products manufacturing, agricultural and orchard crops, waste products from livestock and poultry operations and food processing, urban wood waste, biogenic municipal solid waste, municipal liquid waste treatment operations, and landfill gas.

In recent years, several definitions of “renewable energy” have been added to the Florida Statutes. They are as follows:

Section 366.91(2)(b) Public Utilities:

*“Renewable energy” means electrical energy produced from a method that uses one or more of the following fuels or energy sources: hydrogen produced from sources other than fossil fuels, biomass, solar energy, geothermal energy, wind energy, ocean energy, and hydroelectric power. The term includes the alternative energy resource, waste heat, from sulfuric acid manufacturing operations.*

Additionally, biomass is further defined in the same section to mean;

*“Biomass” means a power source that is comprised of, but not limited to, combustible residues or gases from forest products manufacturing, agricultural and orchard crops, waste products from livestock and poultry operations and food processing, urban wood waste, municipal solid waste, municipal liquid waste treatment operations, and landfill gas.*

Section 377.803(6) Florida Renewable Energy Technologies & Energy Waste and §570.957(1)(d) (Session Law 2007-73) Farm-to-Fuel Grants Program:

*“Renewable energy” means electrical, mechanical, or thermal energy produced from a method that uses one or more of the following fuels or energy sources: hydrogen, biomass, solar energy, geothermal energy, wind energy, ocean energy, waste heat, or hydroelectric power.*

Section 377.703(2)(j) Additional functions of the Department of Environmental Protection; energy emergency contingency plan; federal and state conservation programs:

*“renewable energy resource” means any method, process, or substance the use of which does not diminish its availability or abundance, including, but not limited to, biomass conversion, geothermal energy, solar energy, wind energy, wood fuels derived from waste, ocean thermal gradient power, hydroelectric power, and fuels derived from agricultural products.*

As the State moves forward with the development of its energy policy, one definitive version of the term should be used consistently through out the Florida Statutes.

In reviewing the three versions of the term, they are not all that dissimilar or contradictory. All the named fuel or energy sources that appear in s. 377.803(6) also appear in s. 366.91(2)(b) except that in the later section waste heat is limited to waste heat from sulfuric acid manufacturing operations. The same is true for the expansive language in s. 377.703(2)(j) which specifically includes wood fuels derived from waste and fuels derived from agricultural products, both of which would appear to be encompassed within the clarifying language of biomass in s. 366.91(2)(a.).

There are different limiting terms. The term “ocean thermal gradient power” is used in s. 377.703(2)(j) as opposed to the broader term “ocean energy” in the other referenced sections. Also, hydrogen as used in s. 366.91(2) is limited to sources other than fossil fuels and appears in s. 377.803(6) with no such restrictions. Hydrogen is not specially identified in s. 377.703(2)(j). However, one could assume that it maybe captured by the broad language at the beginning of the definition.

It is also important to look at the purpose of the statutes within which these respective definitions appear. The intent for the first three cited provisions is, in part, the promotion and enhancement of renewable energy sources or technologies. The intent of the last provision is, in part, the economical management of energy problems and pinpointing responsibility for conducting energy programs. The purpose of the first three statutes are similar, and the corresponding definitions of renewable energy are the most similar. It seems appropriate, therefore, to pay particular attention to the language of those definitions since the legislative intent behind the respective statutes is the same as the intent of SB 888, from the 2006 session. To that end, the recommended definition captures the intent of the Legislature to encourage the production of renewable energy.

Other aspects of the definition include; it is not open-ended thereby requiring continuous interruption, the term biomass is clarified and hydrogen from other than fossil fuels is used to help reduce greenhouse gas emissions.

## 37

## Assess

## Florida's Renewable Energy Status

*It is recommended that the Florida Legislature direct the Florida Department of Environmental Protection and the Florida Public Service Commission to produce a current and comprehensive assessment of renewable energy opportunities and demand-side resources and technologies. The assessment should be in depth and allow ample time for appropriate participation by stakeholders. In particular, it should address existing and potential renewable resources and technologies, economic considerations and environmental issues.*

## Assessing Florida's Renewable Energy

## Status is Vital to Our Energy Future

In January of 2003, The Florida Public Service Commission and the Florida Department of Environmental Protection prepared the first comprehensive assessment of renewable electric generation in the state, producing a report entitled *An Assessment of Renewable Electric Generating Technologies in Florida*. Information contained in that document, although still valuable, is dated. In order to make well-informed and broadly accepted policy decisions, it is recommended that the Florida Legislature commission an updated and expanded report.

These state agencies have the resources and expertise necessary to carry out this critical task. Given the profound implications of large-scale energy policy decisions, an appropriate amount of time should be allowed for thorough research and analysis, and the process should provide for participation by the many stakeholders.

# 38 Evaluate

## Florida's Electric Generation

*It is recommended that the Florida Legislature:*

- 1. direct the Florida Department of Environmental Protection to measure the environmental effects of each method used (or proposed for use) in the generation of electricity in Florida.*
- 2. direct the Florida Public Service Commission to evaluate each method used (or proposed for use) to generate electricity in Florida to determine its efficacy in achieving the goals of reliability, affordability, efficiency and diversity.*

## Knowing the Environmental

### Effects of Renewable Energy is Key

(This recommendation contemplates the completion of the report by the Florida Department of Environmental Protection [FDEP] and the Florida Public Service Commission [FPSC] on renewable generation and demand-side resources and technologies suggested in the recommendation entitled Assessment of Florida's Renewable Energy Status. The FDEP's process should create an emission profile and determine a greenhouse coefficient [measured in equivalent lbs of CO<sub>2</sub> emitted per MWh of electricity generated] for each generation method. The FPSC's process should establish the levelized cost [in cents/kWh] and incremental capacity available in Florida [in kW] for each generation method.)

Establishing the environmental benefits and costs for each method of producing electrical energy is necessary to determine the effects of introducing, increasing, or decreasing the use of that method. These effects should be quantified consistently and stated in terms of emission rates based on the generation of a megawatt-

hour of electricity. In order to meet greenhouse gas objectives, a greenhouse coefficient for each method should be determined. This will allow the computation of the total amount of GHG emitted (or avoided) as a result of generating (or displacing) a given amount of electrical power by that method.

In order to make meaningful comparisons of energy production options, a uniform and objective technique should be employed. Criteria should be established and options measured against those criteria numerically. This recommendation implies that a scale be created that is consistent for each criterion. For example, a range of 0-5 could be employed to grade each generation method with respect to reliability, affordability, efficiency and diversity. This will permit the calculation of a single number, which in turn can be used to rank all sources. (See, recommendation on *Ranking of Electric Generation and Greenhouse Gas Emission Goals*).



# 39 Rank

## Electric Generation and Greenhouse Gas Emission Goals

*It is recommended that the Florida Legislature direct the Florida Public Service Commission and the Florida Department of Environmental Protection jointly to:*

1. *establish a ranking for all methods used (or proposed for use) in the generation of electricity in Florida based on the quantitative results determined by the Florida Public Service Commission, as recommended in Measurement and Evaluation of Florida's Electric Generation, and*
2. *determine how to achieve state greenhouse gas emission goals using the quantitative results determined by the Florida Department of Environmental Protection, as recommended in Measurement and Evaluation of Florida's Electric Generation, within the context of this ranking.*

## A Renewable Energy Ranking System Will Link Greenhouse Gas Reduction Goals

The Florida Public Service Commission and the Department of Environmental Protection are the appropriate state agencies to carry out the tasks outlined in this recommendation. Current law (§377.703(3) Fla. Stat.) places these subject matters within the jurisdictions of the two agencies.

The objective of these recommendations is to provide a framework for creating a set of generation scenarios that will simultaneously honor the guiding principles of reliability, affordability, efficiency and diversity and attain environmental and public health goals.

It is recognized that any ranking will be based on current data and assumptions. It is therefore recommended that this process be ongoing and forward-looking. The model can easily accommodate future scenarios by projecting technology advances and economies of scale, for example. The greenhouse effects of each generation method can be calculated under various generation mix scenarios using greenhouse coefficients and incremental capacity data.

In order to determine the relative desirability of energy sources, the process used should be explicit in its assumptions and transparent in its methodology. This recommendation contemplates the use of analytic tools

designed to evaluate multi-criteria alternatives.

An established approach used in this context is the Decision Matrix Method (DMM)<sup>1</sup>. A Decision Matrix is a table listing alternatives in rows and criteria in columns. A scoring system for determining how well each alternative meets each criterion is established, and the alternatives are weighted to reflect their relative importance. Each alternative is evaluated and scores are assigned that measure how well that alternative meets each criterion. The total score for a particular alternative is calculated by multiplying the value of each element in that alternative's row by the weight assigned to the criterion

<sup>1</sup> DMM is used in utility function analysis, and can be formally defined as follows: Let  $u$  be the utility vector, where each  $u_i$  is the total utility score for the  $i$ th alternative. Let  $X$  be the matrix of scores, where  $X_{ij}$  is the element associated with the  $i$ th alternative and  $j$ th criterion. Let  $w$  be the vector of weights, with  $w_j$  the weight associated with  $j$ th criterion. Then the utility function, designated by  $u$ , is given by

$$X w = u.$$

For examples of the use of this method see S. Pugh, Total Design: Integrated Methods for Successful Product Engineering (Wokingham, England: Addison-Wesley, 1990), H. W. Stoll, Product Design Methods and Practices (New York: Marcel Dekker, 1999), pp. 122–130 and Bijay K. Jayaswal, Peter C. Patton, Design for Trustworthy Software: Tools, Techniques, and Methodology of Developing Robust Software (Prentice Hall, 2006), pp. 423–425.



in that element's column and then summing the products. Once the total score is determined for each alternative, they can be ranked in order of preference.

In this context, the alternatives are the various generation methods (e.g., solar PV, coastal wind turbines, nuclear, pulverized coal) and the criteria are the statutory principles (reliability, affordability, improved supply diversity, environmental and public health benefits, and security from damage and prompt recovery). The measure of how well each method meets each principle is then determined using a common scheme, such as a 0-5 scale. The relative importance of each criterion would be established and a weight assigned to each. The total value for each generation method (alternative) would then be determined by multiplying its score for each principle (criterion) by the corresponding weight and summing the products. The total values can then be used to rank all the generation methods.

An analysis such as this will bring important issues to the forefront early in the process of establishing renewable energy policy. It will also avoid surprises later that could make achieving policy objectives more difficult or more expensive than necessary.

## 40

**Establish**

## Generation Scenarios for a Renewable Portfolio Standard

*It is recommended that the Florida Legislature direct the Florida Public Service Commission to utilize the ranking established in Ranking of Electric Generation and Greenhouse Gas Emission Goals to select generation scenarios to develop a Renewable Portfolio Standard (RPS) that will appropriately promote the use and development of renewable energy resources and technologies in Florida. Following development of the RPS by the PSC, the FEC should review the resulting RPS for possible further recommendations regarding goals and the scope of the rules.*

**Renewable Portfolio Standard****Promotes Renewable Energy Use**

Recommendation *Ranking of Electric Generation and Greenhouse Gas Emission Goals* sets forth a process for creating a set of generation scenarios that not only abide by the guiding principles of reliability, efficiency, affordability and diversity but also meet greenhouse emission requirements. The Florida Public Service Commission is the proper state authority to determine which scenario will promote renewable energy appropriately: existing legislation states that the Florida Public Service Commission “may adopt appropriate goals for increasing the use of existing, expanded, and new Florida renewable energy resources.”

# 41 Establish

## Renewable Energy Incentives

*It is recommended that the Florida Legislature provide substantial financial support for the purchase, installation and use of equipment exploiting renewable energy. The eligibility requirements for incentives and their types and amounts should be consistent with the overall energy plan for the state and with forward-looking assessments of renewable energy development. Properly coordinated and funded incentives will result in renewable energy sources rising in the ranking established in Ranking of Electric Generation and Greenhouse Gas Emission Goals.*

### Financial Incentives Could Boost Renewable Energy Technology Purchase and Use

Current financial incentives for renewable energy in Florida are limited and lack coordination. Corporate tax credits are available through the Renewable Energy Production Tax Credit and the Renewable Energy Technologies Investment Tax Credit. A sales tax exemption exists for Renewable Energy Equipment Sales. The Solar Energy System Incentives Program is a rebate program for small scale solar water heating, small scale photovoltaics (PV) and solar pool heating.

Nationwide, incentives for renewable energy include corporate and personal income tax credits and deductions for equipment purchases and installation; sales

and use tax exemptions for equipment; property tax credits, exemptions, and exclusions; rebates to promote the installation of equipment; production incentives (cash payments based on owner electricity production); loan programs (including low and no interest loans as well as direct loans); leasing and lease purchase programs; industry recruitment incentives; and grant programs available primarily to commercial, industrial, utility, education and government sectors.

## 42

## Allow

Third-Party Ownership of On-Site  
Generation Projects

*It is recommended that the Florida Legislature revise Section 366.02(1) of the Florida Statutes to allow, without incurring regulatory jurisdiction of the Florida Public Service Commission, third party ownership of new renewable generation facilities located on the site of an electric energy customer and sale of up to 5 MW of renewable electricity to a single customer provided the facilities are located on the customer's premises. This change should not eliminate the obligation of the local electric utility to provide back-up service or to purchase excess energy generated by the installation.*

## Third-Party Distributed Generation

## Lightens Everyone's Load

Florida law allows energy customers to “self-generate” electric power from equipment located on their property without incurring the jurisdiction of the Florida Public Service Commission. One impediment to the expansion of renewable generation in Florida is the reluctance of energy customers to own and/or operate generation equipment outside of their expertise. There are third party developers willing to invest capital to build such units, operate them, and sell the energy to the customer on a kilowatt-hour basis. But to do this, the developer risks being deemed an electric utility, be-

ing saddled with FPSC jurisdiction, and losing a service territory infringement battle with the local utility.

In order to encourage and increase the application of renewable technologies (e.g., photovoltaic, biomass, and small scale co-generation), Florida law should be revised to allow third party ownership of “on-site” generation projects of up to 5 MW. The local utility should continue to provide back-up service or to purchase excess energy generated by the installation.

# 43 Allow

## Electric Customers to Generate Renewable Electricity

*It is recommended that the Florida Legislature require all utilities to allow all Florida electricity customers to generate renewable electricity (“Distributed Generation”), to allow interconnection to the Florida electricity grid, to allow net metering, and to direct the Florida PSC to adopt corresponding technical standards and appropriate backup rates that are fair to the utility.*

## Net Metering Allows Consumers to Meet Their Energy Needs and Make Money

Distributed generation (DG) systems give electric consumers the capability of generating electricity or mechanical power on site to meet all or part of their own needs, to sell power back to the grid, and sometimes to make use of heat typically lost during power generation. In so doing, distributed generation raises the overall efficiency with which fuel is used. Solar, wind, biomass burning and other methods can be used to create DG.

In addition to improvements in fuel use efficiency and related greenhouse gas reductions, expanded use of distributed CHP (combine heat and power generation) offers significant electricity system benefits including avoided electricity transmission and distribution losses, and avoided requirements for electricity grid expansion.

Policies to encourage CHP use include a combination of regulatory changes and possible incentives for CHP systems which would include net metering and appro-

priate backup rates that are fair to the utility to compensate the utility for the use of its generation and transmission infrastructures. The recommendation would address customers with generation of 100 kW or less.

A concern with backup rates exists within the ratepayer base, in that the backup rates are high enough to make their savings or potential earnings too small to be worth making the initial investment to participate in distributed generation.

In Executive Order 07-127, the Governor requested the PSC to initiate rulemaking no later than September 1, 2007, to authorize a uniform, statewide method to enable residential and commercial customers who generate electricity from on-site renewable technologies of up to 1 megawatt to offset their consumption over a billing period by allowing their electric meters to turn backwards when they generate electricity.

## 44

## Institute

Exemption from the Power Plant Siting Act  
for Waste Heat Recovery Facilities

*It is recommended that the Florida Legislature, in order to encourage further development of existing cost effective renewable energy resources in Florida, enact changes to the Power Plant Siting Act that allow expansions of waste heat recovery renewable energy facilities to be exempted from the Act if the expanded renewable energy facility exports less than 75 megawatts to the grid.*

## Capturing More Waste Heat Encourages

## More Renewable Development

In order to meet objectives of diversifying the state's electric fuel mix, reducing dependence on foreign oil and dealing with climate change problems, non-polluting renewable energy resources must be encouraged. Revising existing policies that inhibit the full utilization of existing "waste heat recovery" renewable energy resources will allow existing industrial electricity customers to operate their facilities more efficiently from both a cost and environmental perspective. It is important to recognize that allowing these renewable assets to be developed to their full output capacity effectively displaces electricity that would otherwise be produced from fossil fuel based power plants. Since there are no emissions associated with the expanded renewable energy production facilities, this policy revision would also result in the elimination of emissions that would otherwise be associated with the fossil fuel power plant.

The Florida Legislature has made significant progress in allowing these renewable energy expansions in the past, including the 2006 revision to the Power Plant Siting Act that allows single expansions of less than 35 megawatt nameplate capacity. However, even this change does not allow expansion projects to proceed that are within the capacity of existing waste heat recovery industrial operations. Further, capping exports to the grid at less than 75 megawatts preserves the intent of the Power Plant Siting Act to allow the Public Service Commission oversight of major generation facilities that supply 75 megawatts or more to the Florida electricity grid.



*It is recommended that the Florida Legislature direct the appropriate agency or entity to adopt standards for generators and boilers requiring new installations to meet certain efficiency and/or performance levels, and that the Legislature provide fiscal and financing incentives, such as a Florida Climate and Energy Fund to increase deployment of high efficiency industrial generators and to utilize waste heat (e.g. combined heat and power systems).*

## Incentives Encourage Manufacturers --- to Capture Waste Heat

Greenhouse gas emissions in the state come from two major sources. Power generating plants rank first in the amount of GHGs that are emitted into the atmosphere. Second would be tail pipe emissions from vehicles. After that, there is a wide host of industries that use generators or boilers in their manufacturing processes. There are no regulated efficiency or performance standards for these energy producers. As new businesses enter the marketplace, inefficiency is perpetuated.

Many manufactures fail to capture and utilize the waste heat that is generated during their manufacturing process. This may be due to inadequate information, institutional barriers, or a lack of financing as new businesses try to enter competitive markets and strive to keep their production costs as low and possible.

One method to take advantage of this situation is to capture the waste heat and use it for industrial or domestic purposes. The combined heat and power process is the simultaneous production of electricity and heat using a single fuel. Heat produced from the electricity generating process is captured and used to produce high and low level steam. The steam can be used as a heat source for both industrial and domestic purposes and in steam turbines to generate additional electricity.

This recommendation calls for efficiency or performance standards for generators and boilers. A financing mechanism that would allow manufacturers to make better use of combined cycle units is also recommended.

# 46 Avoided Cost Premium

*It is recommended that the Florida Legislature incent utilities to meet the requirements of a renewable portfolio standard and strengthen the market for renewable power, provide for the Florida Public Service Commission to allow investor-owned utilities flexibility in the amount of the payments made to qualifying renewable projects for capacity and energy and provide the opportunity for the utility to earn an “add” to the utility’s allowed Return on Equity for meeting or exceeding renewable targets set by the Public Service Commission. The add and any payments over and above the utility’s avoided cost would be recovered through a cost recovery clause in the utility’s rates.*

## Flexibility Will Aid Utilities in Meeting Renewable Portfolio Standard

It is in Florida’s best interest to encourage to production of renewable energy. Reduction of greenhouse gasses and dependence on foreign oil together with local economic development are all benefits accruing to Florida from renewable generation projects. Presently, non-utility renewable generation projects are paid “avoided cost” for their power. The level of these payments has not resulted in the emergence of a robust renewable market in Florida.

The cost of capacity and energy purchased from renewable projects is “passed through” to the customer through a fuel cost recovery clause in the utility’s rates. The utility’s owners do not benefit from such transactions. In order to increase the investor-owned utilities’ motivation to purchase non-utility generated power at a higher rate; their stockholders should be provided an opportunity to benefit. This recommendation provides for utility stockholder motivation to foster and expand the renewable generation market within the state.

# 47 Provide

## Funding for the Farm to Fuel Initiative

*It is recommended that the Florida Legislature fund the Farm to Fuel Initiative for the upcoming fiscal year.*

### Continuing the Farm to Fuel Initiative Helps Florida Reach its Renewable Energy Potential

The Farm to Fuel initiative, s. 570.954, FS, passed by the Florida Legislature in 2006, was created to enhance the market for and promote the production and distribution of renewable energy from Florida-grown crops, agricultural wastes and residues, and other biomass and to enhance the value of agricultural products or expand agribusiness in the state. Together with the Florida Renewable Energy Technologies and Efficiency Act, the initiative is intended to stimulate capital investment in the state, enhance the market for and promote the production and distribution of bioenergy technologies in the state, attract additional bioenergy production in Florida, and in particular, technologies or processes that convert Florida grown crops, agricultural wastes and residues, or other biomass into bioenergy.

The statute also provides that the Department may conduct a statewide comprehensive information and education program aimed at educating the general public

about the benefits of renewable energy and the use of alternative fuels.

Florida has an abundance of biomass that could, with productive research and development, contribute to a significant swing in the way we view energy needs in Florida. The state has some 383,000 acres in sugar cane production, some 160,000 acres of peanuts, 85,000 acres of cotton, 65,000 acres of field corn and 11,000 acres of soybeans; all of which have potential for producing bioenergy. Additionally the state has 15.5 million acres of timber, 749,000 acres of citrus and 193,000 acres of vegetables whose by product alone offers huge potential for conversion into bio-fuels.

The Department is requesting funding to conduct a statewide comprehensive information and education program contemplated by the law.

## 48

## Provide

## Funding for the Farm to Fuel Grants Program

*It is recommended that the Florida Legislature continue, and fund, the Farm to Fuel Grants Program.*

## Renewable Energy Grants Help Renewable Technology Reach the Market More Rapidly

In 2006, the Florida Legislature appropriated \$15 million to the Department of Environmental Protection for the purpose of funding the Renewable Energy Technologies Grants program authorized in s. 377.804, Florida Statutes, to provide matching grants for renewable energy technology demonstration, commercialization, research, and development projects. Five million dollars of the appropriation was contingent upon the coordination between the Department of Environmental Protection and

the Department of Agriculture and Consumer Services (Department) pursuant to s. 377.804(6), Florida Statutes, to fund bioenergy-related projects. The program was very successful with 148 renewable energy applications requesting more than \$185 million with more than \$412 million cost share and 74 bioenergy applications requesting more than \$87 million with more than \$353 million cost share.

*It is recommended that the Florida Legislature establish, and fund, the Biofuel Retail Sales Incentive Program and the Florida Biofuel Production Incentive Program.*

## **Incentives Boost Development** — **and Expansion of Biofuels**

The Federal government has provided the following incentives for ethanol and biodiesel:

- A partial federal excise tax exemption of 51 cents per gallon for ethanol blended into gasoline; and
- An excise tax credit for biodiesel and biodiesel blends of a penny per percentage point of biodiesel blended with petroleum diesel for “agri-biodiesel,” such as that made from soybean oil, and a half-penny per percentage for biodiesel made from other sources, like recycled cooking oil.

There do not exist incentives at the federal level or in the State of Florida for producers or retailers of ethanol and/or biodiesel (biofuels). Section 220.192, F.S., provides an investment tax credit for the production and distribution of ethanol and biodiesel. However, the law is silent as to an incentive for the production of alternative fuels produced from Florida-grown products. Similarly, there is no incentive provided for retail sale of alternative fuels.

In 2007, the Legislature, created a Biofuel Retail Sales Incentive Program and Florida Biofuel Production Incentive Program (HB 7123).

The bill established the Biofuel Retail Sales Incentive Program under the Department for the purpose of encouraging the retail sale of biofuels in this state and replacing petroleum consumption in the state by a certain percentage over a specified period. Subject to specific appropriation, the program would provide incentive payments to qualified retail dealers for biofuels offered for sale.

The Florida Biofuel Production Incentive Program was established under the Department to encourage the development and expansion of facilities that produce biofuels in this state from crops, agricultural waste and residues, and other biomass produced in Florida. Subject to appropriation, the program would provide incentive payments to a producer based on Florida biofuel production.

HB 7123 was ultimately vetoed by the Governor.



# 50 **Revise** Renewable Energy Technologies Investment Tax Credit

*It is recommended that the Florida Legislature revise the Renewable Energy Technologies Investment Tax Credit to enable the transfer of tax credits.*

## Transferable Credits Stimulate

## Tax-Credit Program

SB 888 (2006 Legislative Session) created s. 220.192, F.S., which established a corporate income tax credit program for any investments associated with hydrogen vehicles and hydrogen vehicle fueling stations; commercial stationary fuel cells; and biofuels, including biodiesel and ethanol; including construction, installation, and equipping the technologies in the state. The bill provided the following:

- The credit for stationary fuel cells, hydrogen vehicles and hydrogen vehicle fueling stations will be for 75% of the capital, operational, maintenance, research and development costs;
- The cap for hydrogen vehicles and hydrogen vehicle fueling stations is \$3 million per fiscal year;
- The cap for the corporate tax credit on stationary fuel cells is \$1.5 million per fiscal year; and
- The cap for an investment in the production and distribution of biodiesel and fuel ethanol is \$6.5 million per fiscal year.

This credit program is administered by the Department of Environmental Protection. Each taxpayer must apply to the Department of Environmental Protection for an

allocation of each type of annual credit. The certificate of tax credit issued by the Department of Environmental Protection must be attached to the Florida corporate income tax return on which the credit is claimed. Credits are granted on a first-come, first served basis based upon the date a completed application is received by the Department of Environmental Protection. Credits may be used by a taxpayer against its Florida corporate income tax liability for tax years beginning on or after January 1, 2007, and may be carried forward until tax years ending on or before December 31, 2012.

A number of prospective investors in renewable energy technologies have noted that a relatively small number of Florida-based companies currently have the tax liability status that would enable them to directly benefit from these tax credits. Allowing recipient entities to transfer or sale the credits to companies that are subject to the corporate income tax could stimulate additional interests in this program.

HB 7123 (2007 Legislative Session) included a provision allowing the transfer of tax credits allowed under this program. HB 7123 was ultimately vetoed by the Governor.



# 51 Update

## Florida Renewable Energy Production Tax Credit

*It is recommended that the Florida Legislature amend the Renewable Energy Production Tax Credit (s.220.143, F.S.) to include energy used by the producer.*

### Revising Tax Credit Increases

### Renewable Producers' Development

Distributed generation (DG) systems give electric consumers the capability of generating electricity or mechanical power on site to meet all or part of their own needs, to sell power back to the grid, and sometimes to make use of heat typically lost during power generation. In so doing, distributed generation raises the overall efficiency with which fuel is used. Solar, wind, biomass burning and other methods can be used to create DG.

In addition to improvements in fuel use efficiency and related greenhouse gas reductions, expanded use of distributed CHP (combine heat and power generation) offers significant electricity system benefits including avoided electricity transmission and distribution losses, and avoided requirements for electricity grid expansion.

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priate backup rates that are fair to the utility to compensate the utility for the use of its generation and transmission infrastructures. The recommendation would address customers with generation of 100 kW or less.

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In Executive Order 07-127, the Governor requested the PSC to initiate rulemaking no later than September 1, 2007, to authorize a uniform, statewide method to enable residential and commercial customers who generate electricity from on-site renewable technologies of up to 1 megawatt to offset their consumption over a billing period by allowing their electric meters to turn backwards when they generate electricity.

# 52 Institute

## Sales Tax Exemption for Biofuel

*It is recommended that the Florida Legislature increase the cap on the sales tax exemption for materials used in the distribution of biodiesel and ethanol fuels from \$1 million to \$2 million.*

### Increasing Distributors' Purchase Exemption

#### Increases Biodiesel and Ethanol Distribution

In the United States, ethanol is largely a corn-based fuel ranging from E10, a 10 percent gasoline additive (used to reduce vehicle emissions that works without engine modifications), to E85 that contains just 15 percent gasoline and 85 percent ethanol (used to power flexible fuel vehicles that can run on any kind of fuel).

Biodiesel is a clean-burning alternative fuel made primarily from soybeans. It can also be made from other materials such as vegetable oils, animal fats and spent cooking oils. The pure form of biodiesel is commonly referred to as B100. The most common blend for biodiesel, B20, is 20 percent biodiesel and 80 percent petroleum diesel. It has none of the toxic or environmental hazards of fossil diesel fuel. Biodiesel operates in conventional combustion-ignition engines, from light to heavy-duty, just like petroleum-based diesel.

In 2004, alternative fuels accounted for 1.2 percent of the total market for transportation fuels (177,562 thousand gasoline-equivalent gallons). Although a relatively

small percentage of the total transportation fuel market, biofuels consumption has increased rapidly in recent years. In 1994, biofuels consumption stood at 846 thousand gasoline-equivalent gallons or 0.6 percent of the transportation (140,719 thousand gasoline-equivalent gallons) fuels market. Increased production of biofuels as well as increases in the number of fueling stations which provide bio-based fuels are due to federal and state incentives that encourage the use of alternative fuel or flex-fuel cars as well as increased public education and awareness.

SB 888 (2006 Legislative Session) created a sales tax exemption for materials used in the manufacturing, blending, fueling and distribution of biodiesel and ethanol fuels. There is a cap of \$1 million per fiscal year for the period 2006-2008.

HB 7123 (2007 Legislative Session) included a provision increasing the cap from \$1 million to \$2 million. HB 7123 was ultimately vetoed by the Governor.



# **Strengthening Florida's Energy Supply and Delivery Infrastructure**



# Introduction

Energy infrastructure provides the foundation for secure and reliable access to the energy supplies and services on which Florida depends. The state's energy infrastructure is comprised of many components, and is complex and interconnected. The electricity infrastructure includes a grid of long-distance transmission lines that move electricity regionally, as well as local distribution lines that carry electricity to homes and businesses. Electricity originates at power-generating plants, which are fueled by natural gas, coal, nuclear, oil, and other materials. Generation plants require a dependable transportation infrastructure to deliver the necessary fuels to the power plants. Florida's natural gas and motor fuel industries have their own dedicated infrastructure.

Recent Florida Public Service Commission and the Florida Reliability Coordinating Council assessments indicate that the state's key infrastructure elements generally are adequate and reasonably reliable in the short-term. However, these and other stakeholders also have noted that there are a number of long-term concerns that warrant our attention.

**Fuel Diversity** - Maintaining a balanced fuel supply adds value in terms of supply reliability and price stability. Fuel diversity is not always a cost-savings measure, but rather a risk-mitigation strategy. Maintaining a balanced mix of fuel sources enhances supply reliability and allows utilities to mitigate the effects of volatile price fluctuations. As previously noted, a number of coal-fired plants identified in the utilities' 2007 Ten-Year Site Plans recently have been denied or withdrawn from the certification process. As a result, more than 4,000 MW of capacity proposed for the next decade needs to be replaced. If, for example, natural gas becomes the sole replacement fuel of choice, this will result in natural gas generation producing more than 50 percent of Florida's energy as early as 2013. Given the state's vulnerability to supply disruptions, and the continued volatility in natural gas prices, this trend is problematic.

**New Technologies** - Continued energy technology advances provide hope that Florida can overcome many of its infrastructure challenges. In general, new, more efficient and environmentally attractive energy tech-

nologies and facilities should be easier to site. A broader recognition of how new technologies advance important state and national policy goals can help change the posture of interest groups and the tone of debate with respect to future regulatory processes. But introducing new technologies also presents a number of potential challenges. Many of these technologies, such as next-generation nuclear plants, "clean-coal" facilities, and biomass-fueled plants, are new to Florida. Siting, permitting and operating these types of new facilities may prove challenging for both operators and regulators.

**Transmission Facilities** - Nationally, investment in transmission infrastructure has not kept pace with demands placed on the system. Currently, Florida's transmission infrastructure does not have the constraints that have caused major problems in other areas of the country. At present, significant transmission congestion is localized in the Central Florida region. However, as the state's excess capacity becomes fully used new major transmission will be required. Acquiring and permitting the necessary transmission right-of-way will be expensive and time-consuming. There is evidence that the state's planning and regulatory processes could be changed to expedite siting of new transmission facilities without compromising environmental requirements.

This report presents a series of recommendations intended to strengthen the state's energy infrastructure. These recommendations focus on the following key areas:

- generation diversity
- nuclear power
- fuel supply
- electric transmission
- land use

These recommendations reflect the need to maintain a diverse portfolio of generation technologies with special attention to nuclear power, and the ability for all electric customers of Florida's utilities to benefit from this portfolio. They contain suggestions for increasing the reliability and adequacy of our fuel supply and electric transmission system. Land-use recommendations

are proposed to more efficiently accommodate future energy facilities. Implicit in these recommendations is the fact that even with significant energy efficiency growth, renewable energy resources, and distributed generation, major investments in conventional generating plants will be required.

These recommendations include numerous implications for both the private and public sectors. They will require significant investments to augment existing facilities, replace aging infrastructure, and ensure that Florida's energy supplies will meet current and future needs at reasonable prices, without over-relying on a single fuel source. State and local regulatory and planning processes will need to be streamlined and improved. Importantly, the state must take a more strategic approach to energy and recognize the critical importance of Florida's energy infrastructure.

Ultimately, it will not be possible to meet the state's critical energy and economic needs, including reducing greenhouse gas emissions, and diversifying its transportation fuels, without enhancing, expanding, and diversifying Florida's energy infrastructure.



# 53 Establish

## Priority Order of Preference for Supply/Demand Options

*It is recommended that the Florida Legislature:*

- 1. adopt a policy that provides the widest possible range of energy supply options, ensuring that each supply type meets Florida's minimum environmental criteria as determined by the Florida Department of Environmental Protection, and*
- 2. direct the Florida Public Service Commission to provide guidance to the state's generating utilities through a "priority order of preference" for future supply and demand options based on the guiding principles of reliability, efficiency, affordability, and diversity. In developing the priority order of preference the Public Service Commission should specify that energy efficiency and demand response constitute the preferred options in addressing Florida's future energy needs.*

## Fuel Diversity Enhances

## Reliability and Price Stability

Even with major successes in energy efficiency and conservation, demand for electric power in Florida will likely grow by almost 30 percent over the next 10 years. Presently, natural gas-fueled generation comprises about 37 percent of Florida's capacity as opposed to 19 percent nationally. While renewable generation advances are likely, the vast majority of new energy is expected to be produced from natural gas. This will compound the state's over-dependence on this single fuel, with its associated price volatility and supply disruption concerns.

In order to enhance the reliability and price stability of Florida's electric energy supply, the generation mix must be more diversified. Adding base load generation, particularly nuclear and coal, is a highly capital-intensive, risky and lengthy undertaking for electric utilities. The utilities need assurance that Florida's energy policy will support these investments.

In the past, generation mix primarily has been considered based on utilities' individual needs. But future energy production will require a more strategic, statewide perspective. To provide a guide to accomplish this, an annual calculation of an optimal state generation mix target is needed. This target could be used as a guideline for considering future generation additions.

A number of recent state actions have raised questions regarding Florida's long-term energy policy goals and priorities, especially in the context of generation fuels. This recommendation is intended to provide Florida's utilities with a clear policy statement of priority actions to address the state's increasing energy needs.

# 54 Increase

## The Potential for Nuclear Fuel Generation as an Acceptable Base Load Source

*It is recommended that the Florida Legislature increase the potential for nuclear generation in Florida by:*

- 1. endorsing and encouraging nuclear fuel as a base load generation source,*
- 2. providing resources to the Florida Public Service Commission and the Florida Department of Environmental Protection with which to actively monitor and participate with the Federal government to simplify the permitting process for new nuclear facilities.*

### Nuclear Energy Provides Reliable Energy

#### without Emitting Greenhouse Gases

Last year, nuclear generation produced 13 percent of Florida's electric energy. Nuclear also was the least expensive of all base load energy sources. There have been no significant security or environmental incidents since the advent of Florida's first nuclear unit in 1971, yet no new nuclear generation has been added to Florida's generation mix for 28 years.

According to the U. S. Department of Energy, nuclear energy makes up the majority of non-carbon emitting electricity production. In 2005, 103 U.S. nuclear power plants prevented an estimated total of 681 million metric tons of carbon dioxide emissions. Nuclear power's lower generating cost, significant contribution to the reduction of greenhouse gases, and obvious positive impact on reducing imported fossil fuels, makes it a very desirable option for future generation.

Since its inception in 1973, Florida has had one of the most successful power-plant siting processes in the U.S. Increasing interest in nuclear power has prompted some suggestion that Florida's permitting process could serve as a model for new Federal regulations. Because of this long and successful experience, it is in Florida's best interest to be involved in the emerging federal nuclear permitting process. To ensure that the federal process meets Florida's needs, state representatives should be involved in developing future regulatory requirements and procedures.

This recommendation endorses expanded use of nuclear power as a base load generation source, and encourages the Federal government to create a regulatory environment that fosters expanding nuclear energy in a safe, efficient, and economical manner.

# 55 Encourage

## Reprocessing of Spent Nuclear Fuel

*It is recommended that the Florida Legislature strongly encourage the Federal government to address the spent nuclear fuel disposal issue by endorsing reprocessing as a compliment to long-term storage in the United States.*

### Nuclear Reprocessing Significantly Reduces Stored Nuclear Waste

Floridians have contributed more than \$1.2 billion to the federal nuclear waste disposal development effort, which remains plagued with licensing delays, increasing costs, technical challenges, public opposition and managerial problems. Nuclear-waste reprocessing, a long-standing practice in other countries, recently has garnered considerable interests as an alternative to long-term storage.

Nuclear reprocessing separates any usable elements (e.g., uranium and plutonium) from fission products and other materials spent in nuclear reactor fuels. The goal is to recycle the reprocessed uranium by placing it in a mixed-oxide fuel (MOX). MOX behaves similarly to the type of uranium that most reactors were designed to use, and allows it to be reprocessed. Nuclear reprocessing partially closes the loop in the nuclear fuel cycle, and significantly reduces the amount of nuclear waste required to be kept in storage facilities. In the future, using breeder reactors combined with reprocessing could extend mined uranium's usefulness by more than 60 times.

President Bush's National Energy Policy included the recommendation that "[t]he United States should also consider technologies ....to develop reprocessing and fuel treatment technologies that are cleaner, more efficient, less waste intensive, and more proliferation-resistant." The Department of Energy later requested an expression of interest from domestic and international industry in building a spent nuclear fuel recycling and transmutation facility that would meet these goals.

It is clear that an effective reprocessing program would greatly increase the probability of a viable and robust nuclear energy industry. A show of support from the State of Florida would be a positive move in that direction.

This recommendation implicitly endorses using nuclear energy as a base load generation source in Florida by addressing waste disposal, one of the long-standing obstacles to further deployment of nuclear facilities.

# 56 Institute

## Financial Incentives for Alternative Energy Technologies

*It is recommended that the Florida Legislature provide more extensive financial and regulatory support for energy technologies determined to be appropriate alternatives for Florida through:*

1. *tax incentives,*
2. *incentive rates, and/or*
3. *research grants,*

*with all financial incentives tied to established performance measures.*

## Encouraging Alternative Energy

### Helps to Achieve Fuel Diversity

In order to meet objectives of diversifying the state's electric fuel mix, reducing dependence on foreign oil, and dealing with climate change-related concerns, non-conventional energy sources must be encouraged. Technologies such as biomass, clean-coal processes and renewable-fueled generation present excellent future opportunities. However, projects using these emerging technologies tend to cost more to develop and present more operating risk to the owners.

The Florida Public Service Commission has made significant progress in providing rules that increase developers' ability to obtain financially viable power-purchase agreements. These rules will help existing and potential renewable-energy providers finance new projects, and strengthen established facilities' positions. The early development of the alternative generation industry in California enjoyed these benefits and

more extensive incentive rates, coupled with significant tax advantages. Additional research grants to allow the construction of demonstration projects will further encourage non-conventional energy-source application. To ensure early development of these projects, these benefits should be offered only to those placed in service during the next 5 years.

States that have developed successful renewable energy industries characteristically have promoted stable markets, have designed flexible long-term tax incentives, and (most importantly for attracting investment) have remained steadfast in their commitment to renewable energy. This recommendation is intended to create a policy framework that combines financial incentives and a regulatory environment to support long-term growth of renewable-energy technologies.

# 57 Encourage

## Jointly-Owned Generation Projects

*It is recommended that the Florida Legislature, in order to expand the opportunity to improve individual and overall state system diversity:*

- 1. adopt a policy of encouraging jointly developed and/or jointly owned generating units, and*
- 2. require the Florida Public Service Commission to closely monitor and file an annual report on the status of jointly owned generation projects in conjunction with their Ten-Year Site Plans review.*

### Jointly Owned Generating Units

### Increases Generation Options

In order to achieve future price stability and enjoy new capacity economies of scale, all of the state's electric utilities should have access to a wide range of generation technologies when choosing new capacity. While this is an inherent ability of large systems, smaller utilities are limited in these options. A state energy policy encouraging jointly developed and/or jointly owned generating units could provide impetus for providing such generation options.

In order to determine the level of success of the policy, the Florida Public Service Commission should closely monitor, and file an annual report on, the status of jointly owned generation projects in conjunction with their annual Ten-Year Site Plan review.

This recommendation is intended to encourage the use of innovative technologies through joint ownership opportunities. This recommendation would also further the state's goal of diversifying generation fuels.



## 58

## Assess

## Implementing a Fuel Supply Reserve Margin

*It is recommended that the Florida Legislature, in order to assess and monitor the adequacy of the state's fuel infrastructure, including in-state and out-of-state natural gas and oil storage facilities:*

*require the Florida Public Service Commission to assess the feasibility of implementing a long-term fuel plan including a "fuel supply reserve margin" index based on the aggregate energy demand projections of the regulated utilities, natural gas distribution systems, and transportation requirement, and report its findings to the Florida Legislature.*

## Long Term Fuel Plan

## Includes Fuel Safety Margin

In order to assess the "safety margin" available in the state's electric generation capacity, the Public Service Commission uses an index called the reserve margin. It is the difference between the dependable capacity of a utility system – including firm power purchases excluding capacity for maintenance or forced outage – and the anticipated peak load for a specified period. The Public Service Commission and Florida Reliability Coordinating Council have adopted a 15 percent standard. It would be helpful and informative to have such an in-

dex based on the fuel supply and fuel delivery systems. This index would not only provide analysis for normal conditions but provide contingency information for outages of various elements of the fuel cycle. It would also guarantee a review of the aggregated fuel supply at least once a year.



# 59 Enhance

## Natural Gas Storage Options

*It is recommended that the FLORIDA LEGISLATURE, in order to provide:*

- 1. enhanced system security during weather events,*
- 2. more flexible management of fuel price volatility, and*
- 3. added “peak day” deliverability,*

*direct the Florida Public Service Commission to identify regulatory changes necessary to provide a “clear path” for Florida utilities to obtain and utilize natural gas storage facilities.*

## Natural Gas Storage Reduces Reliance on Other Fuel Sources

Florida is among the nation’s fastest-growing states. By 2013, natural gas demand is anticipated to grow significantly, especially in the peak summer season. Gas storage can provide an important back-up fuel source for Florida should its fuel supply be interrupted, specifically in the Gulf of Mexico, by a hurricane or other unexpected curtailment. Storage facilities located on the Central Gulf Coast can accept reserve supplies in anticipation of such emergencies.

During peak load periods, the energy available by natural gas pipeline is fully used. Using gas storage capacity located near the generation sites will reduce the need to

use other fuel sources, such as oil, to meet system electrical demand. Natural gas storage also may be a valuable hedge during times of volatile price fluctuations.

Natural gas storage will likely become a valuable part of future energy policy in Florida, as it is in other regions of the country. Because it is a relatively new proposal in Florida, statutory and regulatory changes will be necessary to support this infrastructure, including allowances for storage recovery costs.

60

## Encourage

### Deployment of Liquefied Natural Gas Projects

*It is recommended that the Florida Legislature:*

- 1. encourage the deployment of liquefied natural gas (LNG) projects, and*
- 2. instruct the Florida Public Service Commission and the Florida Department of Environmental Protection to closely review such projects as may be economically and environmentally appropriate, and to give priority to removing barriers to the deployment of LNG projects.*

## Liquefied Natural Gas Provides Opportunity to Supplement Florida's Energy Supply

Liquefied natural gas (LNG) is natural gas that has been converted to liquid form for ease of storage or transport. The liquefaction process involves removing certain components such as dust, helium, or impurities that could cause difficulty downstream, (e.g. water and heavy hydrocarbons) and then condensing the gas into a liquid at nearly atmospheric pressure. LNG is transported in specially designed cryogenic sea vessels or cryogenic road tankers, is stored in specially designed tanks, or is directly injected into a gas pipeline system. Delivery systems usually are located at coastal or off-shore sites.

Given Florida's growing dependence on natural gas, LNG offers an opportunity to supplement Florida's energy supply via pipelines. The Public Service Commission and the Department of Environmental Protection should be encouraged to review rules that impede its deployment. Also, federal rulemaking in this area should be closely monitored to avoid potential barriers to meeting Florida's needs.

# 61 Include

## Energy Element in Comprehensive Plans

*It is recommended that the Florida Legislature require local governments to recognize and provide for the inclusion of an energy element in their comprehensive plans*

### Including Energy in Comprehensive Plans Curbs Siting Problems

Adopted by the 1985 Legislature, Florida's Growth Management Act requires Florida's 67 counties to adopt Local Government Comprehensive Plans that guide future growth and development. Comprehensive plans contain chapters, or "elements," that address future land use, housing, transportation, infrastructure, coastal management, conservation, recreation and open space, intergovernmental coordination, and capital improvements. A key component of the Act is its "concurrency" provision that requires facilities and services to be available as development affects the county.

There have been several unsuccessful attempts to include a "utility element" as a required component in comprehensive plans. Electric and natural gas utilities

generally have planning horizons as long as, or longer than, the period of local land use plans. Addressing potential energy infrastructure needs (such as electric generation, substation, transmission, and fuel supply sites and corridors) early in the process can yield benefits for both local citizens and the utility. Utility and city/county planners can, in a public forum, reach consensus on the placement of future energy facilities based on local land use trends. This can potentially eliminate unexpected problems later in the siting process.

# 62 Finance

## New Transmission Facilities to Relieve Congestion

*It is recommended that the Florida Legislature require the Public Service Commission to:*

- 1. ensure the implementation of a cost-sharing process for new transmission lines and upgrades determined to be required for reliability by Florida Reliability Coordinating Council, and*
- 2. provide early cost recovery for associated transmission sites held by regulated utilities for future use and investment in associated lines outside a utility's service territory intended to resolve congestion problems.*

## Financing Projects Facilitate Energy Transmission Upgrades

Florida's electric utilities have a long history of cooperatively developing of transmission projects. Over the years, a number of significant transmission facilities have been jointly financed and built by utilities enjoying the benefits. As the use of the Florida grid becomes more complex under the Federal Energy Regulatory Commission's open-access rules, benefits accrued to individual utilities are less obvious, and the need for transmission upgrades is not always obvious to the transmission-line owners.

The Florida Reliability Coordinating Council (FRCC) is charged with assessing, on a periodic basis, the viability of Florida's electric transmission grid. While problems have been identified, there presently is no formal mechanism to determine how needed projects affecting several utilities are to be financed. Also, regulatory treatment of investments made outside a utility's service territory is somewhat unclear. The Florida Public Service Commission should be given the authority to define and adopt rules for the financing projects identified by the FRCC as needed.

# 63 Amend

## The Power Plant Siting Act and the Transmission Line Siting Act

*It is recommended that the Florida Legislature amend the Power Plant Siting Act and the Transmission Line Siting Act to clarify responsibilities and address procedural concerns.*

### Clarifying Two Acts Addresses

#### Technical and Procedural Concerns

The Power Plant Siting Act (PPSA) is a centralized, coordinated licensing process encompassing the permitting, land use and zoning, and proprietary interests of all state, regional, and local agencies in the jurisdiction of the electric power plant's proposed location. The PPSA provides for a single certification (license) for those electric power plants it defines as steam or solar powered, 75 megawatts or greater, and were constructed after October 1, 1973. The provisions apply to nuclear power in addition to coal, gas and waste-to-energy facilities, although regulation of nuclear radiation is preempted by the federal government. Certain associated facilities may be certified in conjunction with the plant, including transmission lines necessary to connect the plant to the electric grid.

The Transmission Line Siting Act (TLSA) also is a centralized, coordinated licensing process encompassing permitting, land use and zoning, and proprietary interests of all state, regional, and local agencies in the jurisdiction of a transmission line's proposed location. The TLSA provides for a single certification (license) for transmission lines subject to the TLSA. Transmission lines it covers, such as those which are 230 kilovolts

or greater, 15 miles or more in length and cross a county line. Intermediary substations also may be certified as part of the project.

During the 2006 Session the Legislature significantly revised both the Power Plant Siting Act and the Transmission Line Siting Act. The intent was to streamline and expedite these regulatory proceedings. However, subsequent to the bill's implementation, additional procedural and technical concerns were identified. Specific issues of concern included adequate notice of informational meetings by local governments, timelines governing document submittal, and determining completeness for siting applications.

During the 2007 Legislative Session, HB 7123 was introduced to address the concerns noted following passage of the statutory revisions in 2006. HB 7123 ultimately was vetoed by the Governor.



# 64 Utilize

## Certain State Lands to Site Energy Infrastructure

*It is recommended that the Florida Legislature:*

- 1. define electric transmission and fuel supply facilities as critical infrastructure, and*
- 2. after a thorough review of the process for permitting, site approval, compatibility of use, access to public lands, and the development of a process to equitably share the costs, encourage, the co-location of electric transmission and linear fuel supply facilities on appropriate public lands.*

### Infrastructure on Certain State

### Lands Minimizes Environmental Impacts

Critical infrastructure refers to physical and/or virtual systems and assets so vital to the community that if incapacitated or destroyed, the effects would be debilitating to local security, economic security, or public health and safety. In most jurisdictions, energy facilities are included in this category. Any state-adopted energy policy should specifically designate electric, natural gas, and transportation fuel production and delivery systems as critical infrastructure.

As land use becomes a more critical issue in Florida, efficient and diversified use of public lands will become increasingly important. Land presently used for major highways, flood control projects, etc., present excellent

opportunities to accommodate linear utility facilities (power lines, gas pipelines, transportation fuel delivery systems). Co-location of infrastructure minimizes land use impacts by limiting the number of linear features in an area, and reduces environmental impacts through reduced clearing. Interested parties should be encouraged to jointly explore such projects.

In the future, the state should develop a more formal system to balance preserving and managing state lands purchased or managed for their natural resources with the need for energy infrastructure siting.



# 65 Utilize

## Certain Federal Lands to Site Energy Infrastructure

*It is recommended that the Florida Legislature instruct the Florida Public Service Commission and the Florida Department of Transportation to:*

- 1. encourage and work closely with the Federal Department of Transportation to recognize electric transmission and fuel supply facilities as critical infrastructure,*
- 2. gain permission to use appropriate federal lands, where compatible, to co-locate electric transmission and linear fuel supply facilities.*

## Siting Linear Energy Facilities on \_\_\_\_\_ \_\_\_\_\_ Interstate Highways Uses Land Efficiently

The 2005 Energy Policy Act acknowledged the potential for increased use of federal lands for energy distribution infrastructure. The Act directed selected federal agencies to designate multipurpose energy corridors on federal lands in the Western U.S. by August 2007 and in the rest of the nation by August 2009. The central purpose was to perform the environmental and other analyses needed to identify areas on Federal lands suitable for use as energy corridors, and to ensure that, if needed, these corridors will be available for such use in future years.

Any statewide energy policy should be sensitive to the use of Florida's limited and shrinking land resources. In the past, Florida's electric and natural gas utilities have had difficulty gaining permission to place linear facilities on federal rights-of-way.

The ability for linear facilities such as high voltage transmission lines and natural gas pipelines to share land with interstate highways would be a more efficient use of Florida's land. Appropriate state agencies should be encouraged to actively seek cooperation from federal counterparts to accomplish this objective.

# 66 Provide

## For Future Siting for Distributed Generation Systems

*In order to minimize the need for substations and transmission and distribution lines, the Florida Legislature should require local governments to, working in conjunction with their local electric and natural gas utilities, make provisions for siting small generation facilities close to demand centers (distributed generation).*

## Reducing Barriers to Distributed Generation Benefits Everyone

The term “distributed generation” describes electricity generated from multiple small energy sources in various locations, rather than one large, single facility. It reduces the amount of energy lost in transmitting electricity because the electricity is generated very near where it is used, perhaps even in the same building. This also reduces the size and number of power lines that must be constructed.

Typically, distributed power sources have low maintenance, low pollution and high efficiencies. In the past, these traits required dedicated operating engineers and large plants in order to maintain these characteristics. However, modern embedded systems can achieve these

operating characteristics with automated operation and clean fuels, such as solar, wind and natural gas.

Consumers in Florida are allowed to build, own, and operate such facilities to generate power for their own use. Distributed generation also may be a viable option for utilities. Barriers to these applications can be local zoning and land use regulations. Efficiency and energy conservation considerations as well as urban-land limitations favor including the distributed generation option for utilities. Local governments should be encouraged to reduce or eliminate barriers to their application.

# 67 Examine

## The Benefits of Distributed Energy

*It is recommended that the Florida Legislature direct the Public Service Commission to examine the potential economic congestion relief benefits to the major load areas in the State resulting from the development of distributed generation and active load control and to identify economic incentives to developers of distributed generation and active load control that provide relief to such congestion.*

### Distributed Generation Reduces Load Congestion and Costs

The optimal placement of resources, such as distributed generation (DG) and active load management technologies, requires identifying the level of congestion costs on specific locations on the transmission and distribution system. Analytical techniques for determining congestion costs are readily available.

Distributed generation and active load controls perform the same function in that remote generation is not required to provide power to a load in a high demand area. In geographic areas where there is significantly more demand than supply, often generation that is not the least cost alternative is dispatched because lower-cost generation is not accessible on the transmission and distribution system. In those circumstances, DG and active load controls provide power at a far lower cost than remote generation. The lack of optimally located DG and active load controls cause congestion costs to be passed on to Florida's electric consumers. In addition, remote generation results in higher line losses than non-remote generation, which also results in costs to Florida ratepayers.

Because of the cost-of-service regulatory jurisprudence practiced in Florida Public Service regulation, the gen-

eral economic benefits of optimal DG location and active load controls accrue to all ratepayers, as do the costs for not optimally locating these resources. To the extent that these resources are located in congested areas, the benefits can be substantially greater than when located in low demand areas. Optimal location can be rewarded with purely economic subsidies (i.e., net positive economics impacts) which would benefit all ratepayers in the state and be economically neutral to utility shareholders.

The PSC can, in coordination with the control area operators (i.e., utilities) and the FRCC, establish target zones for DG deployment and active load management and target appropriate subsidies that result in lower costs for all Florida ratepayers and are economically neutral to utilities. In other words, since location of DG and active load controls in highly constrained areas results in substantial savings in electric costs for all ratepayers, the economic benefits of these deployments can be maximized when optimally located. Incentives that create ratepayer benefits should be actively pursued.





# **Enhancing Florida's Energy-Related Education, Research and Development Programs**





# Introduction

Energy is an issue of critical importance that will continue to grow in significance as our state and nation face emerging energy challenges and opportunities. To address these challenges and opportunities we must learn to change our behavior by applying new technologies to use energy more efficiently, to lessen the environmental impacts of energy use, and to find new ways to use our energy sources more wisely and more economically. The new energy technologies that will enable this transformation must be created in our distinguished universities and research centers. To ensure that these technologies ultimately reach consumers we must create an environment that encourages technology professionals to advance their research and development efforts from the lab to the marketplace.

To realize this vision for Florida's energy future the state must take steps to enhance its energy-related education, research and development programs. The logical starting point for this effort is education. There is a clear need to increase public awareness and understanding regarding energy-efficient products and services, energy conservation, energy supply, siting of new power generation facilities and transmission lines, and alternative energy sources. There are a range of opportunities and strategies, both in the classroom and in the broader consumer environment, to provide this education. In a related concern, the aging energy industry workforce, combined with the advent of new energy supply and delivery technologies, has raised questions relating to the state's energy-sector workforce. The state must help ensure that skilled personnel are trained and available to deliver energy to consumers.

Florida's universities are currently engaged in a range of energy-related research initiatives. At least seven of the state's 11 public universities currently have one or more energy-specific institutes or programs. Examples of Florida-based energy research programs include:

- Florida Solar Energy Center (FSEC) at the University of Central Florida is statutorily designated as the state's energy research institute. FSEC conducts research in building science, photovoltaics, solar thermal, hydrogen and alternative fuels, fuel cells and other advanced energy technologies.

- Florida Institute for Sustainable Energy (FISE) at the University of Florida brings together the broad research capabilities of the University to address societal needs for a sustainable energy future. Areas of focus include energy efficiency, renewable energy generation, nuclear energy, energy policy/economics, and energy education/outreach. Facilities include a recently awarded Florida Center of Excellence, the FISE Energy Technology Incubator, to accelerate commercialization of energy technologies.

- Clean Energy Research Center at the University of South Florida serves to organize scientific research, technical development, infrastructure development, information transfer in collaboration with energy producers and the transportation sector to support economic development of manufacturing and high technology businesses.

- Center for Excellence in Ocean Energy Technology at Florida Atlantic University is a partnership among academia, industry and government laboratories combining expertise in ocean engineering and science, fabrication and testing, utilizing the South Florida Testing Facility range to foster the research, design, development, implementation, testing, and commercialization of cutting-edge ocean energy technologies.

The individual research efforts of Florida's universities are impressive and will undoubtedly yield significant economic benefits through eventual commercialization. However, there appears to be very little in the way of coordination among the various universities. A number of stakeholders have suggested that Florida needs to establish a mechanism that encourages knowledge and technology exchange between the universities, as well as national energy laboratories and private industry.

Importantly, the new energy-related technologies that are generated through Florida's universities and research centers will not realize their full potential unless the state creates a climate that supports technology transfer and commercialization.

This report presents a series of recommendations intended to enhance Florida's energy-related education, research and development programs. These recommendations focus on the following key areas:

- consumer education
- workforce training
- university research
- market development

# 68 Educate

## State Energy Consumers

*It is recommended that the Legislature initiate and fund a statewide multimedia program of consumer education focusing on, but not limited to, the following:*

- *The value of Energy Star homes, Florida Green Building Coalition green home programs and other beyond code programs.*
- *The value and use of Energy Star products, Home Energy Rating System Index scores and energy efficient mortgages.*
- *The importance of duct performance and the value of sealing and repair programs for existing homes.*
- *The value of proper Heating Ventilating and Air Conditioning (HVAC) unit charging for all homes.*

## Consumer Awareness Increases

A number of states have established innovative consumer education and public awareness programs designed to increase awareness of energy efficient products, services and programs.

*Flex Your Power* is California's statewide energy efficiency marketing and outreach campaign. Initiated in 2001, *Flex Your Power* is a partnership of California's utilities, residents, businesses, institutions, government agencies and nonprofit organizations working to save energy. The campaign includes a comprehensive website, an electronic newsletter and blog, and educational materials. The campaign's primary funding comes from the Public Goods Charge as approved by the California Public Utilities Commission, as well as contributing partner organizations and companies.

As part of its *New York Energy Smart Program* the New York State Energy Research and Development Authority administers a number of programs geared toward making energy more affordable for all New Yorkers.

Through education, home improvements and, training, and better access to services, this program helps New York residents better understand and manage their energy costs.

The *Texas Energy Partnership* is a partnership of the State Energy Conservation Office, the U.S. Department of Energy's Rebuild America Program and ENERGY STAR. The partnership was formed to help affected communities comply with the Texas Emissions Reduction Plan, which contains new energy-efficiency measures that are designed to decrease electric consumption while improving air quality.

Research has documented the tremendous energy savings available to Floridians through a range of existing energy efficiency products and services. Unfortunately, limited consumer awareness of these programs has resulted in minimal market penetration.

## 69

# Enhance

## Utility-Sponsored Consumer Education and Awareness Initiatives

*It is recommended that the Legislature direct the Public Service Commission to encourage utilities to further develop comprehensive plans specific to their climate region to conduct public energy education and consumer awareness campaigns, above and beyond specific product and program marketing, to increase conservation and efficiency.*

### Region-Specific Energy Efficiency Programs

#### Increase Statewide Conservation and Efficiency

There is a need for broad-based education and awareness to enhance participation in utility conservation programs, enhance energy efficiency generally and help consumers make informed choices about energy use. This activity should be funded through the energy conservation cost recovery clause mechanism, with the recognition by the PSC that, because the immediate results of such energy education and consumer awareness efforts may be difficult to measure, the costs should be monitored by the PSC, but not subjected to traditional energy conservation program cost-effectiveness tests.

Currently, each utility over which the Commission has ratemaking authority is authorized to seek recovery of its costs for energy conservation programs. Advertising expense recovered through energy conservation cost recovery must be directly related to an approved conservation program. Similarly, PSC rules specify that such advertising not mention a competing energy source, and not be company image enhancing. When the advertisement makes a specific claim of potential energy savings or states appliance efficiency ratings or savings, all data sources and calculations used to substantiate these claims must be included in the filing.

# 70 Institute

## Public & Professional Education on Climate and Energy Science

*It is recommended that the Florida Legislature direct the FEC to propose educational policy for voluntary programs to inform Floridians on scientific aspects of energy generation, energy use, energy conservation, climate change, and climate change adaptation. The FEO would be responsible for coordinating the implementation of this policy across the state's Boards of Education and various state and local government agencies. These programs would include a coordinated, long-term effort to increase public awareness of the causes and solutions to energy and climate issues. These topics would be included in the curriculum at all education levels (elementary schools, middle schools, high schools, community colleges, and universities), and would be mandatory in the certification of Florida's climate and energy-related professionals (e.g. architects, engineers, construction fields, transportation sector, & healthcare sector).*

## State Government is the Logical Leader for Energy Education

Climate change has become an extremely prolific media topic. But the lack of message unity and the high amount of conflicting information has lead to some degrees of public confusion and marginal campaign results. As the leader in the effort to protect Florida's future, environment and economy, State government is the logical "official voice" for a public education campaign on energy, and in particular, climate change.

An official State voice is needed to convey primary messages to several key audiences and sub-segments of those audiences: The General Public (younger generations, middle generations, older generations), Business & Industry (utilities, the design/build industry, contractors, builders, architects, engineers, health-care, transportation), State and community organizations (professional associations, service organizations), Government

(policy makers, State agencies, State employees, school districts), and Academic (elementary, middle, high and university [related fields] levels).

A crucial aspect of this campaign's success will be ensuring it will be administered centrally, as opposed to being a split, inter-entity effort. This recommendation addresses this need.

Other states in the process of developing and implementing public education campaign plans include Arizona and New Mexico.



# 71 Update

## Driver Education Curriculum

*It is recommended that the Florida Legislature require that Florida driver education courses and driver license examinations include content on energy use topics such as vehicle choices, fuel choices, vehicle emissions, efficient driving practices, car maintenance, optimum tire insufflation, and vehicle idling.*

### Updating Driver Education Curricula

#### Could Help Students Save

Providing educational instruction to new drivers on the energy usage of motor vehicles is a simple and easy way to increase the energy efficiency of vehicles in Florida. Current text used by most drivers' education students provides very limited discussion of issues such as fuel efficiency and fuel-efficient driving practices. The current edition (10th edition) was published in 2003 and makes no mention of low-rolling-resistance tires. Another reference used in drivers' education courses is the Florida Drivers' Handbook. Based on the table of contents, no specific chapter or section is dedicated to fuel efficiency, automobile efficiency, fuel-economy driving practices or low-rolling-resistance tires. Making fuel economy a part of drivers' education courses could encourage students to adopt driving behaviors that save both gas and money.

The State Board of Education requires programs and courses funded through the Florida Education Finance Program and courses or programs for which students may earn credit toward high school graduation to be listed in the Course Code Directory (CCD). The State Board approves additions and changes to the CCD on an annual basis. Local school boards have an annual opportunity to identify new courses or changes to existing courses for which there is a need and submit them to the State Board for review, approval and inclusion in the CCD. County residents can use the form designated for additions and changes to initiate the process at the local level.



# 72 Increase

## Energy Workforce Training and Education

*It is recommended that the Florida Legislature instruct the Board of Education to:*

- 1. provide high-school guidance counselors with the basis to encourage appropriate students to pursue energy-industry careers and institute post-secondary level energy education curriculum and programs,*
- 2. develop programs to expedite direct secondary school relationships with the state's utilities in order to educate students about the energy industry, and*
- 3. provide energy-sector educational curricula to be taught during middle school grades.*

## Florida's Economic Success Depends on a Trained Energy Workforce

By 2020, Florida's population is projected to grow to 23.4 million. This equates to a 30 percent increase in electric customers. U.S. electric utilities expect 11 to 50 percent of their workforce to retire within the next five to ten years. Aging workforce is cited among the three top concerns of U.S. utilities. Three quarters of Florida's electric systems cite the accelerated pace of retirement as a major concern. Occupations of particular concern are power plant operators, linemen, electricians, plumbers, pipe fitters, steamfitters, and engineering technicians.

A well-trained and educated energy workforce is critical to Florida's future economic success. There are a number of initiatives underway, principally in the private sector, to increase the future worker pool. A public policy is needed to support efforts presently being carried out by the electrical industry and educational institutions. The need to ensure an adequate supply of energy workers in the future warrants a place in public policy. There is need for commitment of state funds and active participation by public-private partnerships to develop and act on workforce-development solutions.

## 73

# Integrate

## Energy-Related Education into Community College Curricula and Continuing Education Programs

*It is recommended that the Florida Legislature, in order for the public to have an opportunity to better understand energy issues and satisfy the increasing public desire to be involved as educated consumers in the decision process, direct the Florida Community College System to:*

- 1. incorporate energy-related curriculum into life-long learning and continuing education offerings, and*
- 2. develop and promote an energy certificate/degree program*

## Every Energy Consumer Needs

## an Energy Education

Few aspects of life impact citizens, business and society as much as energy. The production and use of energy has a critical effect on the environment, climate, public health, public policy, financial well being, and national security. Decisions made by every individual as well as by energy companies and governments contribute to the complex web of energy supply and demand, but few individuals or institutions understand or have studied the convergence of issues related to energy.

There is a need to offer consumer education programs to:

- increase consumer awareness of retail rates and options,
- provide a working knowledge of efficiency and energy conservation applications and techniques,
- present an understanding of the energy production cycle,
- facilitate informed consumer decision-making, and
- afford the consumer an objective and credible source of energy information.

In order to reach as many consumers as possible, these education programs should be undertaken by the community college system and offered as certificate/degree courses

# 74 Establish

## State University System/Electric Power Institute

*It is recommended that the Florida Legislature establish an Electric Power Institute within the State University System to address (at both undergraduate and graduate levels) the following:*

- 1. training in emerging fuels and power technology and management, and*
- 2. provide for a scholarship program within the Institute funded by the state's electric utilities with matching funds provided by the State of Florida.*

## Industry Engineers and Managers

### Need In-State Education Opportunities

The energy industry historically has been largely comprised of technology-based businesses. The advent of new technologies and processes, such as renewable generation and greenhouse gas capture and sequestration, coupled with the apparent re-emergence of nuclear generation is placing pressure on Florida utilities to increase the recruitment of well-trained engineering and managerial personnel.

There is a need to increase opportunities for potential utility engineers and managers to pursue a comprehensive education in utility systems and management

without leaving the state. Such programs should provide education on current and emerging technologies essential to the future of the state's energy systems. Florida's higher education institutions should be encouraged to take the lead in providing such opportunities. Likewise, the state's utilities should be encouraged to provide meaningful employment for the graduates of these programs to reduce any out-migration of technical talent.

# 75 Institute

## Research and Development Programs for Renewable Energy

*It is recommended that the Florida Legislature direct the Florida Department of Environmental Protection to submit a comprehensive research and development program for the exploitation of renewable energy in Florida. This would include support for activities at public and private institutions of higher learning and in private industry.*

### Deployment Programs are Necessary to Expedite the Transition of Research to the Consumer

The proposed program should establish a renewable energy research and development grant program focused on funding promising biomass, ocean, solar, and wind energy research activities with significant potential to provide energy and economic development in Florida. High priority should be given to technologies where federal funding opportunities are limited or non-existent.

Funding should be considered for the following categories:

1. basic research to investigate and develop fundamental understanding of very promising, high payoff, long term, technologies that may provide the basis for substantial advances in renewable energy generation,
2. technology development and prototyping to investigate, develop, and demonstrate the feasibility and practicality of technologies that have advanced beyond basic research and have commercial potential, and
3. commercial scale demonstration to provide proof of technological feasibility, operability, and production capacity at relevant scales.

The Department of Environmental Protection is the appropriate state agency to recommend a broad based research and development strategy for renewable energy. Current Florida law makes that department the state clearinghouse for indexing and gathering all information related to energy programs in state universities, in private universities, in federal, state, and local government agencies, and in private industry.

# 76 Fund

## Education to Increase Renewable Skills and Technologies

*It is recommended that the Florida Legislature provide direction, authority, and funding to the Florida Board of Education and other appropriate agencies to:*

- 1. develop and deploy educational programs to encourage and increase the availability of crafts and skills needed to design, manufacture, specify and install renewable technologies;*
- 2. promote curricula appropriate for primary, secondary and post-secondary education sectors on the subjects of the sources, uses and benefits of renewable energy, and the benefits of energy conservation and efficiency.*

## A Trained Workforce and Educated Consumers are Crucial to Renewable Energy's Success

A trained workforce will be critical for the development and deployment of renewable energy resources and technologies. The availability of skilled technicians and workers will attract new industries to the state and will promote economic development associated with the growth of the renewable energy industry. It is therefore recommended that workforce development in this area become a priority for education in Florida.

An informed populace is essential to the broad recognition and acceptance of the benefits of renewable energy, conservation and efficiency. Therefore, these subjects

should become a part of the curricula at all levels of education. Moreover, people will be more likely to conserve energy and purchase energy-efficient products if they understand the positive financial and environmental consequences.

Implicit in this recommendation is the promotion of adult education and lifelong learning programs at the state's community colleges. It is essential that people of all ages have the opportunity to learn about these important issues.



## 77

## Provide

A Forum for Discussion of Energy Research  
Using Research Summits

*It is recommended that the Legislature direct the Florida Energy Commission and the Florida Energy Office to convene an annual energy research summit to provide a forum for the state's academic community to examine energy-related research initiatives and opportunities for cooperative/collaborative research.*

## Summits Increase Collaboration

## Between Academic and Research Entities

With a number of world-renowned energy research institutes and rapidly expanding alternative energy research capabilities, Florida is poised to become a national leader in the research needed to meet the challenges of today's energy and environmental problems. By working together, the state's public and private research centers and institutes can generate the synergies

that will propel the state into national prominence in this important and timely research arena.

While numerous state and private academic units have hosted energy research-themed conferences and events in recent years, there is presently no statewide forum where Florida's energy researchers can assemble to exchange findings and ideas. Additionally, directing the Florida Energy Commission and the Florida Energy Office to coordinate this summit would enable the research community to directly communicate their recommendations regarding the state's energy-related research programs and priorities to these policy development entities.



# 78 **Coordinate** Florida's Energy-Related Research and Development

*It is recommended that the Florida Legislature direct the Florida Energy Commission, in cooperation and coordination with the state university system and the independent colleges and universities, to develop a strategy for enhancing research in support of Florida energy policy with the goal of deploying related research and technology into the marketplace as soon as possible. Importantly, this recommendation is not intended to be detrimental to the state's important long-term research initiatives.*

## Florida Needs a Strategy to Hasten Deployment of New Technology

The discovery of new energy technologies, or improvements in existing technologies, could provide a major achievement in enhancing Florida's energy security or lowering the state's greenhouse gas emissions. That is why it is critical to develop a rapid deployment strategy for commercialization of new energy-related technologies and products.

A number of other states have taken steps to link energy-related research and economic development. For example, research funded in part through the California Energy Commission has led to the establishment of new alternative energy industries that contribute \$6 billion annually to California's economy and support 36,000 jobs in the state. In addition, the Commission's Energy Technologies Advancement Program generated \$6 in matching funds for every \$1 invested by the state,

which has added approximately \$370 million in state gross product and \$10.3 million in state and local tax revenues. Similarly, the Commission's Transportation Energy Technologies Commercialization programs have provided \$25 million in program funding to attract over \$95 million in private funds to commercialize advanced transportation energy technologies.

This recommendation is intended as a companion to other recommendations that support the development of an economic development plan that targets renewable and alternative energy industries. Together, these recommendations are aimed at creating the research and business climate necessary for Florida to become a world leader in the energy field.

# 79 Formulate

## A Strategy for Alternative Energy-Related Economic Development

*It is recommended that the Florida Legislature direct the Florida Energy Commission to work in conjunction with Enterprise Florida to formulate an economic development strategy that targets renewable and alternative energy companies and creates the business environment in Florida necessary to make the state a major center for the development and expansion of energy-related companies.*

## Florida Could Become a Hub for Renewable and Alternative Energy Development

Florida has created a number of programs to provide financial incentives for the production of renewable energy. For example, the 2006 Florida Energy Act established the Renewable Energy Technologies Grants Program to provide renewable energy matching grants for demonstration, commercialization, research and development projects relating to renewable energy technologies. The grant program is designed to stimulate capital investment in the state and promote and enhance the statewide utilization of renewable energy technologies. Similarly, the Solar Energy Systems Incentives Program provides rebates for purchase and installation of solar energy systems in homes and businesses.

Enterprise Florida is the state's public/private partnership responsible for assisting startup companies in the

state and for recruiting existing businesses to Florida. Enterprise Florida was created to assume the economic development responsibilities of the now defunct Florida Department of Commerce and operates at the state and local levels. Enterprise Florida, which has considerable expertise in business assistance and job creation, currently recognizes alternative energy as one of the state's "emerging technologies."

Florida should build on its early successes in the field of renewable energy by developing a long-range economic development plan tailored to enhance energy-related research with the goal of deploying such research into the market place as soon as possible.

*It is recommended that the Florida Legislature require, and be a condition for, all grants or other monetary awards to private business for energy related research or deployment projects, a negotiated or licensing agreement that after commercialization of the product or process, an amount or percentage of the profits as agreed to will be returned to the state.*

## Providing a Return on Florida's

## Research Investments Benefits the State

It is vitally important for the state to continue its support of private energy research and deployment projects. Such collaboration between the public and private sector is essential if the potential of such efforts are to be realized.

However, such partnerships are always contingent on the availability of state revenues. Such reality was evident during a recent special session when over one billion dollars was cut from the state's budget. Even in times when the economy has been particularly robust, funds for energy-related research have been far less than needed. A certain exception was legislative ac-

tion in 2007 when \$62 million in non-recurring general revenue was funded in the Budget and Implementing Bill.

To help combat this struggle for funding, it is appropriate that private sector success that was funded, in part, by the state help fund future research which, in turn, can provide additional benefits to the citizens of this state. The requirement of such agreements in this recommendation serves that purpose.





# **Developing Issues for the FEC's 2008 Report**





# Introduction

The Florida Energy Commission's first year was challenging. The Commission spent its first year working with Florida's energy stakeholders – a primary one being members of the public – to gather, discuss and distill the information it would need to make sound first-year recommendations.

The FEC addressed reducing greenhouse-gas emissions, a ubiquitous issue in state government this year, and also attempted to formulate or capture as many practical ideas as possible in the short amount of time available. This report reflects the FEC's initial, sweeping approach to developing recommendations to state energy policy from that effort.

In the coming year, the Commission's approach will be distinctly different. The FEC will take a more narrow focus and concentrate on critical energy-policy issues. To that end, the Commission will target several issues that have been major obstacles to implementing far-reaching energy-policy reform. These issues follow as recommendations to be addressed in the FEC's 2008 report to the Legislature.

## 81

## Identify

## Strategies for Reducing Transportation Sector Greenhouse Gas Emissions

*It is recommended that the Florida Energy Commission, as part of its statutory requirement to identify for the Legislature issues that are to be addressed in forthcoming years, approve for consideration during the upcoming year and inclusion in its 2008 report methods for achieving a reduction in GHG emissions caused by Florida's transportation sector.*

## The FEC Will Investigate

## Transportation Issues in 2008

The Commission's statutory responsibilities include developing an overall state energy policy as well as being specifically charged with evaluating greenhouse gas emissions and making recommendations for the reduction of such emissions. As the Commission proceeded with its activates this first year, it mainly focused on the utility sector, including; conservation and efficiency activities, generation and transmission practices, climate change issues, and renewable energy issues. It was a function of time, rather than the significance of the issues or solutions that limited the Commission's agenda.

Even with such limited opportunity, several transportation sector recommendations were considered and adopted by the Commission. They include a driver education curriculum, the elimination of sales tax on energy saving, low rolling resistance tires, energy efficient government vehicle practices, and the use of renewable fuels. But these issues only touch the surface of what could, or should, be addressed. Depending on which report one reads, Florida's transportation section is responsible for between 40 to 45% of the State's GHG emissions.

The transportation sector is in many ways as complicated if not more so, than the utility sector. The types of fuels used, the types of vehicles driven, the number of miles driven per person as well as the State's growth management practices all hold answers on how best to lower GHG emissions flowing from the ever growing number of cars and trucks utilizing our highways and streets.

It is only appropriate that the Commission address these issues. This year, additional recommendations relating to sales tax incentives to encourage the purchase of high fuel-efficiency cars and trucks and other fuel efficiency measures are being considered. But more options must be researched and studied so that the Commission can proceed in a deliberate and informed manner. Only by deferring until next year's report the transportation issues that the Commission did not have the time to properly develop, including new issues which must be part of any overall successful solution, can the Commission adequately discharge its statutory responsibilities.

# 82 Examine

## Incentives and Regulatory Reform

*It is recommended that the Florida Energy Commission, as part of its statutory requirement to identify for the Legislature issues that are to be addressed in forthcoming years, approve for consideration during the upcoming year and for inclusion in its 2008 report a review of rate regulation and utility practices in order to propose incentives or differing regulatory mechanisms which would encourage the adoption of energy efficient programs and practices by utilities.*

### A Revised Regulatory Scheme Could Motivate a Boost in Energy Efficiency Programs

Traditional “rate of return” regulation requires the Florida Public Service Commission to set an investor owned utility’s revenue requirement based on expenses incurred during a typical “test year” plus the opportunity to earn a rate of return, or profit. Pursuant to Chapter 366, Florida Statutes, all rates for service provided by a utility shall be fair and reasonable. Likewise, the Florida Public Service Commission in setting rates is authorized to give consideration to a variety of utility activities including energy conservation and the efficient use of alternative energy resources provided; however, that no utility shall be denied a reasonable rate of return upon its rate base. A utility, obviously, covers its costs and earns a profit by selling power to residential and commercial customers. The more power sold the easier to cover costs and earn a profit.

Criticism of this method of regulation is that it provides no incentive to a utility to encourage its customers to adopt energy efficient practices that may result in lower sales. Lower sales reduces a utility’s net revenue and its ability to recover its fixed costs. The amount of profit will also be lower. This disincentive may also affect a utility’s corporate interest regarding other public policy incentives promoting energy efficiency, such as improved building codes or appliance standards.

As a result of this apparent basic conflict between a utility’s corporate interest in higher sales and the public interest in advancing energy efficiency, a number of states have implemented alternative regulatory mechanisms designed to change the economic effects of energy efficiency on a utility’s revenue requirement. One such popular mechanism is the concept of “decoupling” power sales levels from fixed cost recovery, including the rate of return. However, decoupling alone is not the answer. New investment in energy efficiency measures and other changes in regulatory practices are necessary to create a system that encourages cutting costs and saving energy. To that end, Florida’s entire regulatory structure for how revenues and rates are regulated should be reviewed by the Florida Energy Commission with the goal of determining how to encourage the adoption of energy efficient programs and practices by utilities.

# 83 Identify

## A Dedicated Funding Source for Energy-Related Programs

*It is recommended that the Florida Energy Commission, as part of its statutory requirement to identify for the Legislature issues that are to be addressed in forthcoming years, approve for consideration during the upcoming year for inclusion in its 2008 report a proposed dedicated funding source designed to provide a revenue stream for identified energy related incentives and programs, including a mechanism for the disbursement of monies collected.*

### Dedicated Funding May

### Help Energy Programs

During the last regular legislative session \$62 million was appropriated for energy related programs. Unfortunately, a greater need was still unmet. To further complicate the situation, the \$62 million was not general revenue monies, but rather non-recurring revenue which meant a new funding source must be found with each new fiscal year if a similar amount is to be again appropriated. During a recent special legislative special session, over a billion dollars was trimmed from the State's budget as a result of lowering state revenues. With such budget cuts, it is unlikely that such a significant amount of money will again be available to fund new or even established energy related programs.

In order to overcome such fiscal pitfalls, a revenue source funded by assessments, fees, or some other permanent mechanism will be necessary. For example, the documentary stamp tax (the so-called "doc stamp") is

collected on all recordable instruments as provided for in Chapter 201, Florida Statutes. The monies collected from the doc stamp are distributed in accordance with a statutory formula to a variety of programs: including among others, Preservation 2000 Bonds, Save Our Everglades Trust Fund, highway construction, and affordable housing, and the Classroom for Kids Program.

In addition to creating a particular funding mechanism, the programs and incentives on which such revenues are to be spent should be identified and evaluated. A process for allocating the collected monies among the energy related programs should also be specified. These responsibilities should be allocated to the appropriate state entity, or allocated under any new energy governance infrastructure that may be created during the upcoming Legislative Session.

# 84 Evaluate

## Establishing a Public Benefits Fund

*It is recommended that the Legislature instruct the Florida Energy Commission and the Public Service Commission to evaluate the establishment of a public benefits fund (also known as a “system benefits charge”). The Florida Energy Commission should report its findings and recommendations to the Legislature by December 31, 2008.*

### A Public Benefit Fund Could be the Funding Mechanism for Energy Programs

Public Benefit Funds (PBF) are typically created by levying a small charge on every customer’s electricity bill. These funds provide an annual revenue stream to fund energy efficiency programs. The charges range from 0.03 to 3 mills per kilowatt-hour (kWh) and are equivalent to about \$0.27 to \$2.50 on a residential customer’s monthly energy bill. Where there are comprehensive, statewide programs in place, funding levels range from about 1 to 3% of total utility revenues. The objectives of PBF programs for energy efficiency include:

- Saving energy and avoiding new generation through long-lasting improvements in energy efficiency.
- Lowering energy demand and reducing air pollutant and greenhouse gas emissions.
- Reducing customers’ energy costs.

Most of the 20 states that have established a PBF also use these revenues to support development of clean energy supplies, such as renewable energy and combined heat and power, provide assistance to low-income consumers, support consumer education, and support research and development of new clean energy technologies.



## 85

## Identify

## Options to Reduce Greenhouse Gases and Address Climate Change Issues

*It is recommended that the Florida Energy Commission, as part of its statutory requirement to identify for the Legislature issues that are to be addressed in forthcoming years, approve for consideration during the upcoming year and for inclusion in its 2008 report a review of the various options for reducing green house gases and other related climate change issues.*

## Reducing Green-house Gases and Responding to Climate Change are Important

The importance of climate change as part of an overall state energy policy can not be overstated. Florida, in particular, may be more vulnerable to the impacts of climate change than other states. Therefore, as Floridians, we must be responsive and join other states and nations in reducing greenhouse gases if we are to continue enjoying our way of life.

In 1988, the Intergovernmental Panel on Climate Change (IPCC) was formed to assess, among other things, information relevant to understanding the scientific basis of the risk of human induced climate change. Thousands of experts from over 130 countries are contributing to this ongoing assessment. The IPCC has already found that it is very likely that human activities, primarily fossil-fuel use, land use, and agricultural activities have caused an increase in the greenhouse gases that cause climate change.

Carbon (CO<sub>2</sub>) makes up the overwhelming majority of greenhouse gases. The second most prominent GHG is methane (CH<sub>4</sub>), which is emitted in far lower quantities, but is more potent than CO<sub>2</sub>. The other commonly recognized GHGs are nitrous oxide (NO<sub>2</sub>), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF<sub>6</sub>). Florida currently ranks fifth nationally in the amount of energy consumed per capita and third in total energy consumption. As we grow with almost one thousand people moving to our state every day, the amount of greenhouse gas emission will also grow.

During the past year, the FEC's Climate Change Advisory Group has addressed this issue and recommendations creating GHG targets and a GHG registry, among others, have been adopted. It has become apparent that there is much to understand about how best to proceed; how best to proceed for our citizens and rate payers, and how best to proceed for our utilities, transportation sector, agricultural community, and manufacturing industries.

It has also become apparent that the FEC's Commissioners need more time to further discuss the pros and cons of the various options for going forward and the costs associated with those particular options. One must also understand the cost of not going forward with any of the options. The best way to resolve the situation is to continue the debate into next year before the full Commission and propose our recommendations to the Legislature in our 2008 report.



# Commission History

Last year, energy – seemingly overnight – became one of the most ubiquitous topics of conversation in government and business circles, and for much of the general public. But in actuality, the emergence of energy as a critical and urgent issue has been years in the making.

Early on, Florida Senator Lee Constantine (R-Altamonte Springs) recognized the need for a comprehensive state energy policy, and drafted legislation for the 2006 session. In doing so, Sen. Constantine recognized that energy's complex and broad nature would make an independent commission a better forum in which to hear and discuss the policy considerations, issues and changing technologies that energy policy would entail.

By forming the Florida Energy Commission (among other things), SB 888 created a legislative entity that would, by Dec. 31, 2007, provide the President of the Florida Senate and the Speaker of the Florida House of Representatives with its first set of annual recommendations for a comprehensive state energy policy. The policy would be based on the guiding principles of reliability, efficiency, diversity and affordability.

The 2006 Legislature ultimately passed the bill, which also required that FEC members have expertise in energy, natural resource conservation, economics, engineering, finance, law, consumer protection, state energy policy or another field substantially related to the Commission's duties and functions. The bill also specified that Commissioners would serve two-year terms, with some members initially appointed to serve one-year terms to establish staggered terms.

By late 2006, the FEC's members had been appointed: Chairman Tommy Boroughs, and Commissioners (Senator) Lee Constantine; Blake Casper (resigned May 2007); J. Sam Bell, Jr.; William J. "Bill" Cramer, Jr.; Mike Hightower; John O'Brien, Ph.D.; Todd L. Sack, M.D.; and Joseph "Joe" King Tannehill, Sr.. In September 2007 Frederick Driscoll, Ph.D. was appointed to the FEC.

By Feb. 2007, the Commission was fully staffed. On Feb. 9, it met for the first time in Tallahassee. The FEC was charged for its first year to focus on climate change, renewable energy sources, and energy efficiency and conservation. At its inaugural meeting the FEC created four advisory groups to research and discuss each of these areas, as well as the area of energy supply and delivery.

In its first year, the FEC has exemplified its high regard for public involvement as an essential core part of developing an effective state energy policy. Any Floridian who uses energy is a part of Florida's energy community and a stakeholder in Florida's energy future. As such, all Floridians should be given the opportunity to participate in energy-policy development. Adhering to this philosophy, the Commission tried to bring its meetings to as many Floridians as possible. The FEC and its advisory groups met 26 times in eight Florida cities: Cocoa, Dania (Ft. Lauderdale), Jacksonville, Orlando, Panama City, Tallahassee, Tampa and St. Petersburg. In doing so, it heard nearly 80 presentations by members of the state and national energy and business communities, and testimony from dozens of Florida citizens.

Since its launch in March, the FEC's Web site has provided nearly 15,000 visitors with free, on-demand access to information relating to its members, meetings, recommendations, media mentions and staff. In 2007, hundreds of citizens, many of whom signed up to receive future FEC communications, had attended FEC meetings on their own behalf, or on behalf of the business community.

This public-involvement process has helped to produce this report, and represents the voices of Florida's citizens and business, and the merging of the current energy era with one in which Florida's ever-evolving energy needs can be continually addressed.



# Commission Members

*The Florida Energy Commission's (FEC) nine members are appointed by Florida's Senate President (4) and Speaker of the House of Representatives (4). The FEC's Chairman is jointly appointed.*

*Commission members have a breadth of knowledge in the areas of energy, natural resource conservation, economics, engineering, ocean-energy technology, finance, law, consumer protection, ocean-energy technology and other specialty areas crucial to the FEC's mission.*

## The Florida Energy Commission

**Tommy Boroughs, Chairman**  
**Partner, Holland + Knight, Orlando**  
**Term: 08/21/06 – 08/21/08**

Thomas "Tommy" Boroughs earned his Bachelor's degree from the University of South Carolina in 1961, and his law degree from Duke University in 1968. Between earning his degrees, he served in the U.S. Marine Corps as a Radar Intercept Officer in an F-4 fighter/bomber with a tour in Vietnam. Throughout his career, he has served in various capacities as a local, state and national leader in the electricity and planning industries and in his community.

Mr. Boroughs served as President of the Orlando Utility Commission Board from 2004-2006, and remains a member. He also chaired the American Public Power Association's Policy Makers Council in 2005-2006. In December 2005, former Governor Jeb Bush appointed Mr. Boroughs to the Florida Energy Forum. He currently serves on Governor Crist's Energy and Climate Action Team, and on the Florida Solar Energy Center's Advisory Board.

Mr. Boroughs was voted the 2006 Florida Municipal Electric Association Member of the Year.

Mr. Boroughs is an integral part of his community. He is a past Chairman of Orlando's Naval Training Center/Community Redevelopment Agency Advisory Board and has served as a Governor-appointed member of the East Central Florida Regional Planning Council and as Chair or as a member of numerous other civic and professional boards and organizations.

**Honorable Lee Constantine**  
**Florida Senator, District 22**  
**Term: 06/19/07 – 06/19/09**

Sen. Lee Constantine, the only legislator on the Commission, has been a public servant for more than 25 years. He was elected to the Senate in 2000, and represents District 22, which covers parts of Orange and Seminole counties. Since elected, Sen. Constantine has been recognized as a leader for his commitment to preserving the quality of life for all Floridians, especially in the areas of education, environment, growth management and economic development. In 1974 Sen. Constantine graduated from the University of Central Florida with a Bachelor's degree in Communications.

Sen. Constantine chairs both the Senate's Responsible Regulation and Calendar Committee and its Ethics and Elections Committee. He also serves on the Senate Committees on Law and Justice and Calendar; Communications and Public Utilities; Transportation; Rules; Higher Education; and

Education Pre-K-12 Appropriations, as well as the Joint Legislative Committees on Everglades Oversight and the Public Service Commission Oversight.

Throughout his legislative career, Sen. Constantine has sponsored numerous bills of high significance, including the 2006 Senate Bill 888, which created the Florida Energy Commission. He also sponsored the Florida Forever Program (1999), Everglades Restoration (2000), The Florida Unified Building Code (2000), Pre-K Education (2003), The Wekiva Parkway and Protection Act (2004), and the Florida Telecommunication Act (2005). During the 2006 legislative session, he sponsored a bill that helped to establish the medical school at the University of Central Florida.

Sen. Constantine is also active in his home community. He has served as Chairman of Wekiva River Basin Commission since 2004, as well as having chaired the Wekiva River Basin Coordinating Committee and Wekiva Task Force. He is a past Mayor, Deputy Mayor and City Commissioner of Altamonte Springs and received the Altamonte Springs Lifetime Community Achievement Award in 1993.

**J. Sam Bell, Jr.**  
**Commissioner, Florida Energy Commission**  
**Term: 07/12/06 – 07/12/08**

J. Sam Bell, Jr. has been a part of the energy industry for forty years. He earned his MBA from the University of Miami, and his Bachelor's degree in electrical engineering from North Carolina State University. Mr. Bell has extensive experience in managing public and private utilities, non-regulated generating companies and the energy service industry.

Mr. Bell is experienced in all phases of electric and natural gas system operation. He has experience with conventional power production and has been personally instrumental in developing renewable resources such as wind, solar, geothermal, biomass, and waste-to-energy facilities.

During his 23-year career with Florida Power & Light, he held positions in operations, engineering, system and strategic planning, and general management. In 1985, he was appointed President

and CEO of ESI Energy, Inc. (now FPL Energy, Inc.), a wholly owned subsidiary of FPL's parent company engaged in developing, financing, and operating cogeneration and small power production facilities nationwide. He co-founded ConServe Energy, an industry conservation and energy management provider. He also served as the City of Tallahassee's Electric Department director before being promoted to the position of assistant city manager, where he oversaw electric, natural gas, water and sewer, solid waste, and the storm water system.

Mr. Bell has consulted with energy customers and suppliers, including Tenaska Inc., Solar Reactor Technologies, Bankest Capital, Florida State University, the National High Magnetic Field Laboratory, Leon County, the Leon County School Board, and the Tallahassee Housing Authority.

Mr. Bell is a Registered Professional Engineer (retired), a Fellow in the Florida Engineering Society and a Life member of Phi Theta Kappa and Beta Gamma Sigma.

**William C. "Bill" Cramer, Jr.**  
**President/Owner of Tommy Thomas Chevrolet (FL), Bill Cramer Motors, Bill Cramer Nissan (GA), and Outlet Rental Car Sales North, South and Enterprise (AL)**  
**Term: 08/14/05 – 08/14/07**

William "Bill" Cramer earned his Law degree at Harvard Law School, and his Bachelor's degree in Mathematics from the University of North Carolina at Chapel Hill. During his career, he has accumulated a distinct combination of legal, business, industrial and military experience.

Mr. Cramer has been a member of the Gulf Power Board of Directors since 2002, and currently chairs its Controls & Compliance Committee. Mr. Cramer also has been a member of the Panama City-Bay County International Airport Authority's Board of Directors since 2004 and is its Vice Chairperson. From 1998 to 2000, he was a member of the Community College of the Air Force's Board of Visitors – from 2001 to 2004, he served as its Chairman.

Mr. Cramer has been on the Gulf Coast Community College District Board of Trustees, and is

its current Chairman. In 1999, he served on the Education Commissioner's Blue Ribbon Committee on Education Governance for the State of Florida.

In 2005, Mr. Cramer received the Florida Distinguished Service Medal Award for exceptionally meritorious service to the Florida National Guard. He also is a recipient of the Association of Community College Trustees' M. Dale Ensign National Trustee Leadership Award, and twice has been awarded the Florida Association of Community Colleges Trustee of the Year Award.

For more than 25 years, Bill Cramer has been in the automotive business. In 1986, he was approved by General Motors as a franchised dealer. He currently owns 5 auto dealerships in Florida, Georgia and Alabama.

**Michael R. "Mike" Hightower**  
**Vice President, Blue Cross & Blue Shield of Florida**  
**Term: 07/12/06 – 07/12/08**

Michael R. "Mike" Hightower is Blue Cross and Blue Shield of Florida's Vice President of Governmental and Legislative Relations. He received his Bachelor's degree from Jacksonville University, and served in the U.S. Air Force from 1967 to 1971. He has spent the last 20 years working with state & local government, business and academic communities, and volunteer organizations to improve Floridians' quality of life.

A past Chairman of the Board of Directors of the JEA, Mr. Hightower currently serves on Leadership Florida's Board of Directors, and as its Northeast Regional Chairman. He also serves The Jacksonville Chamber of Commerce as its Chairman of Membership. He is Vice Chairman of the Florida House Board of Trustees, Washington D.C. He also serves on the Florida Chamber of Commerce's Legislative Policy Council and the World Affairs Council.

Mr. Hightower is active in his community. He serves on Boards of the Florida Insurance Council, and the Florida Ounce of Prevention, and co-chairs the Jacksonville Public Library Capital Campaign. He is a Past President of the Children's Resource Fund of South Florida.

Mr. Hightower has won several awards including the Joseph E. Lee Public Service Award, the

Children's Resource Fund's Soaring Eagle Distinguished Service Award and Florida Insurance Council's Wade E. Holland Distinguished Service Award.

**Todd L. Sack, M.D.**  
**Physician, The Borland-Groover Clinic, P.A.**  
**Term: 06/19/07 – 06/19/09**

Dr. Todd Sack received his Doctor of Medicine degree at the University of California School of Medicine, and his Bachelor's Degree in science at Yale College. As Chairman of the Florida Medical Association's Environment and Health Section, he has developed educational programs and FMA policy positions on topics related to energy use and public health. Dr. Sack is a Jacksonville physician specializing in gastroenterology, and a partner of the Borland Groover Clinic. He has 17 published papers, abstracts and presentations, reviews and textbook chapters.

Dr. Sack is a member of JEA's Clean Power Advisory Board, and a member of the Florida Department of Health's Community Environmental Health Advisory Board. He also is a two-term member and chairperson of the Jacksonville Environmental Protection Board.

Dr. Sack has served as both as an Associate Investigator at the Veterans Administration Medical Center in San Francisco and an Instructor of Medicine/Assistant Professor of Medicine at the University of California School of Medicine. In addition, he continues his interest in medical education as serving as the Chairman of the Continuing Medical Education committee at St. Vincent's Hospital and as an educator within the Family Practice Residency program also at St. Vincent's Hospital.

**Frederick R. Driscoll, Ph.D.**  
**Director, Center of Excellence in Ocean Energy and Asst. Professor, Florida Atlantic University Department of Ocean Engineering**  
**Term: 09/07/07 – 09/07/09**

Dr. Frederick "Rick" R. Driscoll received a multidisciplinary Doctorate degree in the areas of Mechanical Engineering and Physical Oceanography



in 1999 from the University of Victoria. He also received his Bachelor's degree in Mechanical Engineering with a business-management option from the University of Victoria in 1994.

Dr. Driscoll's background is a strong combination of business leadership and scientific research. Before joining FAU, he served as President and CEO of Deep Sea Technologies Ltd. As an undergraduate student, he worked for Mobil Oil, Gulf Canada Resources, and the Canadian National Energy Board.

Dr. Driscoll has received several research awards, including the Pioneer Award from the Energy Oceans Conference, the Florida Atlantic University's Researcher of the Year Award and the College of Engineering and Computer Science's Researcher of the Year award. His publications include more than 25 journal and conference papers. He currently has one issued patent associated with technology licensed to Lockheed Martin.

Throughout his career, Dr. Driscoll has acquired millions in research funding to develop ocean-energy technologies and a Rapidly Deployable Stable Platform to support the Naval SeaBasing program.

#### **John O'Brien, Ph.D.**

**President & CEO, Vista Energy Group, Inc.**

**Term: 06/19/06 – 06/19/08**

Dr. John N. O'Brien has more than 30 years of professional experience in the energy business. He received his Master's and Doctorate degrees at the Maxwell School of Public Administration, Syracuse University; and his Bachelor's degree in Chemistry, also from Syracuse University. His background is a strong mix of science, and energy-sector business, economics and leadership.

Dr. O'Brien currently is President and CEO of Vista Energy Group. He has held high-level executive positions at Global Change Associates, an international energy consultancy, and Skipping Stone, Inc, a domestic US energy consultancy. He is experienced in energy-sector investment banking and analysis and founding and building energy businesses.

Dr. O'Brien founded and served as President and CEO of Wheeled Electric Power Company, All Power Corporation, and Direct Gas Supply Cor-

poration, Corporation – all retail suppliers of natural gas and electricity. He also served the United States Department of Energy's Brookhaven National Laboratory in the Department of Nuclear Energy as a Scientist.

Dr. O'Brien is an experienced public speaker on many electricity and natural gas-market topics. He has testified on these and other subjects before the United States Congress, and several state legislatures and regulatory bodies. He also has conducted training sessions for the Federal Energy Regulatory Commission, the Nuclear Regulatory Commission and others.

Dr. O'Brien's experience includes the restructuring and functioning of the electric and natural gas markets and infrastructure in the U.S. and Canada. He also has substantial knowledge of implementing clean-coal technologies, climate-change issues and markets, generation plant siting, nuclear power-plant permitting and licensing, permitting and project finance mineral-rights and royalty issues, among other things.

#### **Joseph Tannehill, Sr.**

**President & CEO, Tannehill International Industries, Inc.**

**Term: 10/31/05 – 10/31/07 (holding over until replacement is appointed)**

Joseph "Joe" King Tannehill is Chairman and Owner of Tannehill International Industries, Inc, which sells industrial scales, agricultural machinery, and air-pollution and dust-control equipment. He earned his Master's degree in Mechanical Engineering from Mississippi State University, and his Bachelor's degree from the Georgia Institute of Technology. Between degrees, he served his country as a first lieutenant in the U.S. Army. Mr. Tannehill served on the Florida Energy 2020 Study Commission.

Mr. Tannehill is a key figure in Bay County's banking and trade industries. He currently chairs the Port of Panama City, and the Bay County – Panama City Airport Authority. He sits on the boards of Regions Bank of Northwest Florida, and Baskerville-Donovan Architects/Engineers. He is a past member of the Gulf Power Board of Directors, and a past Chairman of its Audit Committee. He also has chaired the Panama City Port Authority and the Bay County Chamber of Commerce.



Mr. Tannehill is a past Audit Committee chairman for Gulf Power Corporation, and SunTrust Bank.

Mr. Tannehill also donates significant time to community service. He is a past Chairman of the Bay County Economic Development and the Bay County Military Affairs Committees. He also is a past Board member of the Bay County United Way, the Bay County Salvation Army, the Bay County Committee of 100 and the Bay County Heart Association, among others.

Mr. Tannehill also serves on the boards of the Gulf Coast Community College and the Georgia Tech Department of Mechanical Engineering.

### **Harvey Ruvin**

#### **Miami-Dade Clerk of Court**

**Term: 12/07/07 – 12/07/09 (Appointed after the final 2007 FEC meeting)**

Harvey Ruvin earned a degree in Industrial Engineering from the University of Florida in 1959, and his Juris Doctor from the University of Miami Law School in 1962.

He has served as Mayor of North Bay Village (1968 – 1972) and as Miami-Dade County Commissioner for twenty years (1972 - 1992), chairing its Environment and Land Use Committee. Mr. Ruvin has chaired the South Florida Regional Planning Council twice. He has served as Miami-Dade County's elected Clerk since 1992. He currently chairs the Miami-Dade County Climate Change Advisory Task Force (CCATF). The CCATF, recently established by County Ordinance, is missioned to make recommendations on continuing efforts to reduce Greenhouse Gas emissions as well as what steps are needed to enhance resiliency to climate change impacts.

Mr. Ruvin's national service achievements include terms as President of the National Association of Counties (NACo), as a member of the Sustainable Communities Task Force of President Clinton's Council on Sustainable Development, President Carter's Council on Energy Efficiency, Presidents Ford and Carter's Intergovernmental, Science, Engineering and Technology Advisory Panel to the Office of the Science Advisor to the President, served three years on the Advisory Committee on Intergovernmental Relations and chaired its Research Committee under Presidents Reagan and

Bush. He is also a past Chairman of the Urban Consortium of Public Technology, Inc. He was recently named by PTI as America's "Public Technologist" for technology innovations in the Miami-Dade Clerk's Office.

Mr. Ruvin is a founder of the International Council for Local Environmental Initiatives (ICLEI) and has served as its International Vice Chairman and President of USA - ICLEI. ICLEI is a worldwide movement of local governments seeking to have its collective efforts impact global environmental and sustainability concerns.

Mr. Ruvin has won many awards, including the South Florida Chapter of the American Society for Public Administration's 2004 Public Administrator of the Year Award, and American City and County Magazine's County Leader of the Year Award. He is the only person to have received Tropical Audubon's Conservation Award twice. His proudest moment was when a baby Manatee was given the name "Harvey" to acknowledge his efforts to preserve the endangered species. He has sponsored a host of initiatives that have bolstered South Florida's environmental, conservational and social atmospheres.



# Advisory Group Members

The Florida Energy Commission (FEC) spent its first year focusing on four pressing issues to be addressed in its first set of recommendations: climate change, renewable energy, energy efficiency and conservation, and energy supply and delivery.

To gather the viable, Florida-specific information it would need to craft a comprehensive state energy policy, the FEC created the Advisory Groups on Climate Change, Renewable Energy, Energy Efficiency and Conservation and Energy Supply and Delivery.

The four Advisory Groups, led by FEC members and consisting of 57 volunteer members, were charged to provide the FEC with information to help produce a sound, realistic energy-policy report using the guiding principles of efficiency, reliability, affordability and diversity.

Because of its unique environment, economy and growth patterns, Florida's energy situation and the solutions that will improve it are unlike those of any other state. These characteristics present a unique set of circumstances that would have bearing on any proposed energy policy's effectiveness. While some of these characteristics present significant hurdles to overcome, they also are part of what makes the Floridian lifestyle unique and beautiful.

The wealth of knowledge acquired from these committed groups has enabled the FEC to use this set of recommendations to begin the process of securing Florida's energy future. The FEC applauds and appreciates advisory group members' dedication and willingness to contribute to this process – often at their own expense.

## Climate Change

The Climate Change Advisory Group's (CCAG) process provided the FEC with the knowledge necessary to advise lawmakers on forming a comprehensive state climate action plan and reducing greenhouse gas emissions.

The recent proliferation of climate-change information has fueled a public sense of urgency to reduce greenhouse-gas emissions and to mitigate the damages they

pose to the environment. At most CCAG meetings, public testimony was united by a common plea to address climate change quickly to minimize its effects on the Sunshine State.

**Dr. Todd Sack, Chair**

*Also representing Florida Medical Association*

**Dr. John N. O'Brien, Co-chair**

*Also representing Vista Energy Group*

- **Athena Mann**, JEA Energy Office
- **Charles Pattison**, 1,000 Friends of Florida
- **Denise Stalls**, Environmental Affairs, Orlando Utilities Commission
- **Joseph "Ken" Bryan**, Sierra Club, St. Johns County
- **Manley K. Fuller, III**, Florida Wildlife Federation
- **Paul Steinbreicher**, Environmental Permitting, JEA Government Relations
- **Dr. Pierce Jones**, Program for Resource Efficient Communities, University of Florida
- **Robert Farmer**, Concept Communiqués, Inc. and Third Planet
- **Bentina Terry**, External Affairs and Corporate Services, Gulf Power
- **Randy LaBauve**, Environmental Services, Florida Power & Light Co.
- **Joy Towles Ezell**, Sierra Club, Florida Chapter
- **Stephen Adams**, Florida Department of Environmental Protection
- **Tom Larson**, Global Warming/Energy Committee, Florida Chapter Sierra Club
- **Dr. Duane DuFreese**, Florida Research, Hubbs-Sea World Research Institute
- **Ann Vanek Dasovich**, Florida Wildlife Federation
- **J. Michael Kennedy**, Progress Energy
- **Laura R. Crouch**, Tampa Electric Company
- **Susan Glickman**, Southern Alliance for Clean Energy
- **Dr. James Fenton**, Florida Solar Energy Center
- **David Mica**, Florida Petroleum Council

## Energy Efficiency and Conservation

The FEC created the Advisory Group on Energy Efficiency and Conservation (AGEEC) to advise the FEC on ways to help utilities and government promote energy efficiency and conservation on both the supply and demand sides of the energy market.

Especially challenging for the AGEEC was the task of determining the best ways to encourage energy consumers to take advantage of underused existing efficiency programs, and to help them see energy for what it actually is - a finite commodity, not an infinite resource.

**Mike Hightower, Chair**

- **Bruce Doueck**, Jacksonville Energy Authority
- **C.T. Hsu**, C.T. Hsu + Associates
- **Dennis Brandt**, Florida Power & Light
- **Gary Brinkworth**, City of Tallahassee Utilities
- **G.W. Robinson, G.W. Robinson Builders**
- **Holly Binns**, Environment Florida
- **Howard Bryant**, Tampa Electric Company
- **Jeff Curry**, Lakeland Electric
- **John Masiello**, Demand Side Management and Alternative Energy Strategies, Progress Energy
- **Keith Swilley**, Gulf Power
- **Lane Mahaffey**, Seminole Electric Cooperative
- **Philip Fairey**, Florida Solar Energy Center
- **Rick Dixon**, Florida Building Commission

## Energy Supply and Delivery

The Energy Supply and Delivery Advisory Group (ESDAG) was formed to explore ways to efficiently, economically and reliably generate, supply and deliver electricity while protecting the environment and public health.

The ESDAG's charge centers around the daunting task of assessing the current energy supply and delivery infrastructure's ability to provide reliable power under normal and abnormal circumstances, and to promptly recover service during unusual circumstances when an

outage may be unavoidable, such as severe hurricanes and other emergencies.

**J. Sam Bell, Chair**

**Joseph Tannehill, Sr., Co-chair**

- **David Batt**, Consumer Energy Alliance of Florida
- **Gus Cepero**, Florida Crystals Corp.
- **J.B. Clark**, Florida Electrical Workers Assn.
- **Ben Crisp**, Progress Energy Florida
- **Eric Draper**, Florida Audubon
- **Tom Hernandez**, TECO Energy
- **Harold McLean**, Retired Florida Public Counsel
- **David R. Mica**, Florida Petroleum Council
- **Barry Moline**, Florida Municipal Electric Association
- **Ed Regan**, Gainesville Regional Utilities
- **David Rogers**, Florida Natural Gas Association
- **David Rossin**, Former Asst. Secretary for Nuclear Energy, U.S. Dept. of Energy
- **Rene Silva**, Florida Power & Light Co.
- **Ken Trump**, Gulf Power Co.
- **Bill Willingham**, Florida Electric Cooperatives Association

## Renewable Energy

The Advisory Group on Renewable Energy's (AGRE) responsibility was to investigate renewable energy issues and to develop a comprehensive state renewable energy plan – no small feat in a state with renewable energy resources vastly different from those available to many other states.

Using a public-involvement process the AGRE addressed renewable fuel possibilities for sectors including transportation and land use, power generation, residential, commercial and industrial activities, waste management, agriculture and forestry, emissions-reporting systems and public education.

**William C. "Bill" Cramer, Jr., Chair**

**J. Sam Bell, Co-chair**

- **Jay S. Levenstein**, Florida Department of Agriculture and Consumer Services
- **Bob Reedy**, Florida Solar Energy Center, Photovoltaic Division
- **Brad Crispell**, Covanta Energy
- **Dr. Lonnie Ingram**, Department of Microbiology and Cell Science, University of Florida

- **Rich Blaser**, Infinite Energy
- **Robert L. McGee**, Gulf Power Corporation
- **Sean Christiansen Ph.D**, L-3 Communications CyTerra
- **Steven Davis**, Industrial Consumer, Mosaic Fertilizer
- **Frank R. Leslie**, Florida Institute of Technology, Department of Marine and Environmental Systems





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We have done our best to keep track of all who contributed to this process. Please forgive any omissions from this list – they most definitely were unintentional.

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Florida Atlantic University  
Florida Building Commission  
Florida Chamber of Commerce  
Florida Homebuilders Association  
Florida Reliability Coordinating Council  
Florida Renewable Energy Producers Association  
Florida Solar Energy Center  
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Municipal Utilities of Florida  
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Senate Copy Room  
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U.S. Department of Energy  
Workforce Florida  
World Resource Institute



# Sources

The Florida Energy Commission has spent much of its year gathering information to use to support its recommendations, and to provide the necessary background to facilitate readers' clear understanding of why the recommendations are important.

In writing this report, the Commission has relied on the wealth of data presented at its meetings, and meetings of its advisory groups, as well as other helpful documents, including the following:

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  - [www.usgbc.org](http://www.usgbc.org)